



## SECTION 4 COUNTY PROFILE

This profile describes the general information of the County (physical setting, population and demographics, general building stock, and land use and population trends) and critical facilities located within Dutchess County. In Section 5, specific profile information is presented and analyzed to develop an understanding of the study area, including the economic, structural, and population assets at risk and the particular concerns that may be present related to hazards analyzed (for example, a high percentage of vulnerable persons in an area).

### 4.1 GENERAL INFORMATION

Dutchess County covers an area of approximately 802 square miles and is home to over 280,000 people. Located in southeastern portion of the State of New York, the County is located within commuting distance of New York City and the State Capital of Albany, in the heart of the Hudson Valley. The County is bordered to the west by the Hudson River, and to the east by the State of Connecticut. Most of Dutchess County is characterized topographically by the low elevations of the Mid-Hudson Valley, though the entire County is characterized by a range of landscapes, including mountains, valleys, rivers, lakes, streams, forests, and farmlands. The County is comprised of 30 municipalities (two cities, 8 villages, and 20 towns).

#### 4.1.1 Physical Setting

This section presents location, topography and geology, hydrology and hydrography, climate, land use and land cover.

##### Location

Dutchess County is located in the southeastern portion of the State of New York. It is bordered on the north by Columbia County; on the east by Litchfield County, Connecticut; on the south by Putnam County; and to the west by Ulster and Orange Counties (separated from Dutchess County by the Hudson River).

##### Hydrography and Hydrology

Hydrology is the study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks (groundwater), and in the atmosphere (Dutchess Area Environmental Science Advisory Network (ESAN), 2008). A complete description of Dutchess County hydrology would include profiles of the numerous ponds, lakes, creeks, and rivers which make up the waterscape of the County, including characteristics of the water flowing through those waterways, as well as providing details on all other factors that influence the hydrologic cycle including climate, geology, land use/cover, and vegetation (ESAN, 2008). Many of these aspects of Dutchess County's hydrology will be discussed in more detail later in this plan, relative to specific areas of known hazards.

Broadly, Dutchess County is characterized by a humid, continental climate, with summer and winter temperatures ranging from 74.7 degrees Fahrenheit (°F) to 26.2°F, respectively. The average annual precipitation is 38 inches, with a recorded annual snowfall of 42.2 inches. The precipitation is fairly evenly distributed throughout the year (FIS, 2012).

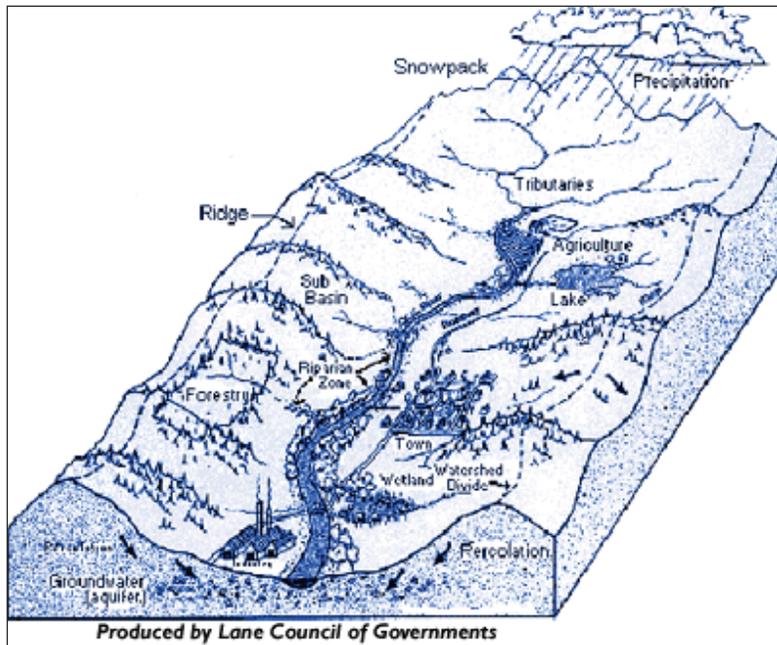
The lower half of the Hudson River, including the portion running through Dutchess County, is part of a tidal estuary and influenced by tidal flow. Two bridges span the River in the County: the Franklin Delano Roosevelt Mid-Hudson Bridge between Poughkeepsie and Highland, and the Hamilton Fish Newburgh–Beacon Bridge. Municipal, County and state-owned parks provide access to waterfront landmarks and sites throughout Dutchess County (Cornell Cooperative Extension Dutchess County (CCEDC), 2010).



## Watersheds

A watershed is the area of land that drains into a body of water such as a river, lake, stream, or bay. It is separated from other systems by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it. For example, the watershed of a lake would include not only the streams entering the lake but also the land area that drains into those streams and eventually the lake. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams. Figure 4-1 depicts the hydrologic system of a watershed.

**Figure 4-1. Watershed**

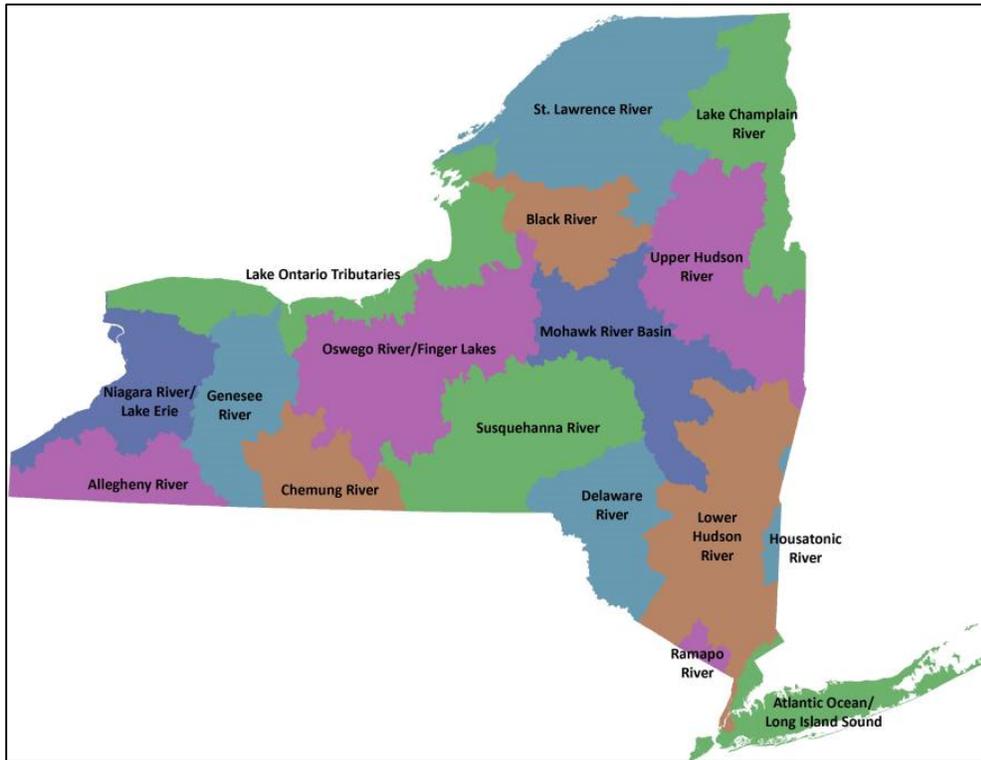


Source: U.S. Environmental Protection Agency (USEPA), 2012

Watersheds come in all shapes and sizes and can cross municipal and county boundaries. New York State's waters (lakes, rivers, and streams) fall within one of 17 major watersheds (or drainage basins). Figure 4-2 shows the watersheds located in New York State.



Figure 4-2. Watersheds of New York State



Source: NYSDEC 2014 (<http://www.dec.ny.gov/lands/26561.html>)

Most of the land in Dutchess County, or roughly 67 percent of the county’s 807 square miles, is within the Hudson River drainage basin, draining to the Hudson River through the Wappinger Creek, Fishkill Creek, and several smaller streams including the Casperkill, Fall Kill, Crum Elbow, Landsmankill, Saw Kill, and Stony Creek. This drainage basin in Dutchess County is composed of three unique watersheds: the Hudson Direct, Wappinger Creek, and Fishkill Creek Watersheds. Another 210 miles or 26 percent of the county falls within the Tenmile River basin and drains into the Housatonic River in Connecticut and eventually to Long Island Sound. The remaining 7 percent of the county is divided between two other watersheds: a small area in the southeastern corner drains into the Hudson River via the Croton River and a small portion in the North that drains to the Hudson via the Roeliff Jansen Kill (CCEDC, 2010). All of these basins within Dutchess County are listed below along with the various rivers, creeks, and streams contained therein as reported in the 2012 Dutchess County FIS (FEMA FIS, 2012).

- HUC 2020008060 Wappingers Creek to Castle Point: Wappinger Creek, East Branch Wappinger Creek, Little Wappinger Creek, Great Spring Creek
- HUC 1100005480 Ten Mile River: Ten Mile River, Wells Brook, Webatuck Creek, Kelsey Brook
- HUC 2020008070 Castle Point to Fishkill: Fishkill Creek, Sprout Creek, Whortlekill Creek, Clove Brook, Pray Pond, Clove Mountain Creek
- HUC 2030101080 Upper Croton River: East Branch Croton River, Tributary to East Branch Croton River
- HUC 2020006200 Jansen Kill to Rhinecliff: Landsman Kill, Stony Creek
- HUC 2020008010 Rhinecliff to Wappingers Creek: Fall Kill, Rhinebeck Kill, Landsman Kill, Crum Elbow Creek, Maritje Kill

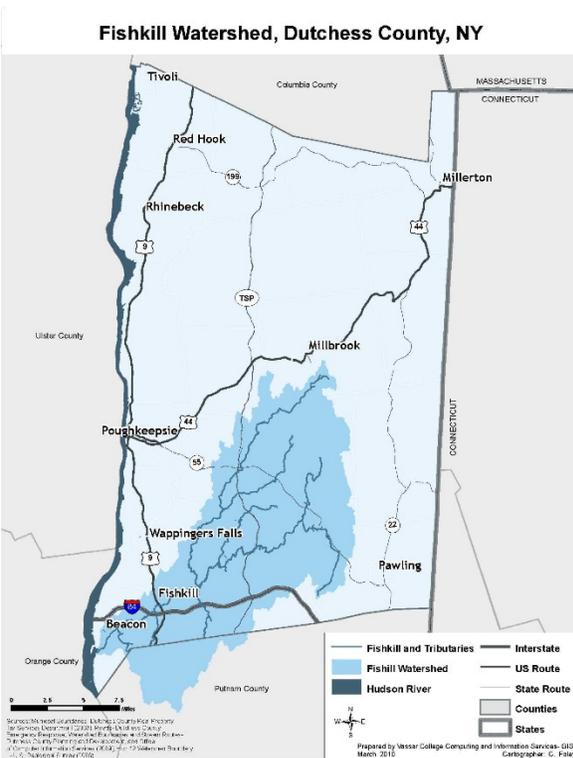
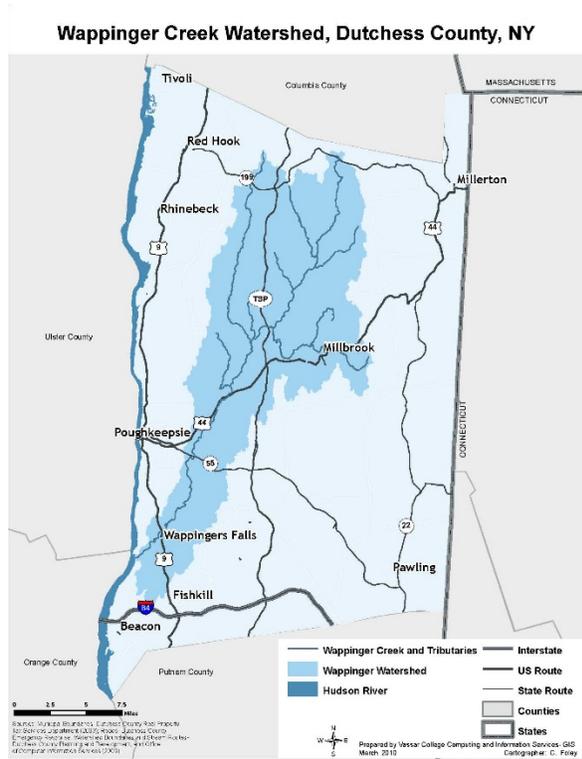
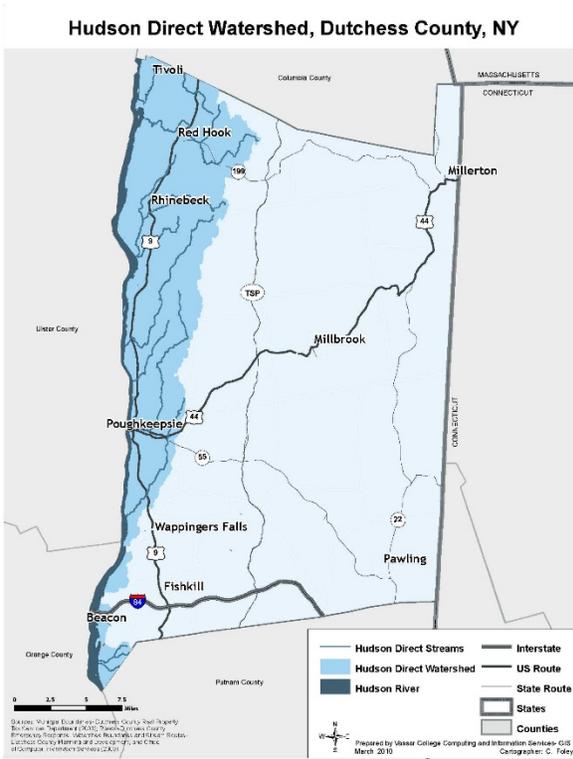


### **Hudson River Drainage Basin - Hudson Direct Drainage**

The Hudson Direct Drainage area includes all portions of Dutchess County that drain directly into the Hudson River. This includes both of the County's cities of Beacon and Poughkeepsie; the towns of Tivoli, Red Hook, Rhinebeck, Milan, Clinton, Hyde Park, Pleasant Valley, Poughkeepsie, Wappinger, and Fishkill; and the villages of Red Hook and Rhinebeck. Even though the County's two urban centers fall within this drainage area, a full 47% of this watershed is covered by deciduous forest, and another 18% by agricultural uses like pasture land and hay fields (Cornell Cooperative Extension Dutchess County (CCEDC), 2009).



Figure 4-3. Hudson River Drainage Basin: Hudson Direct Drainage, Wappinger Creek Watershed, and Fishkill Watershed



Source: CCEDC, 2009 (<http://www.dutchesswatersheds.org/watersheds>)





### Hudson River Drainage Basin – Wappinger Creek Watershed

As noted above, the Wappinger Creek watershed covers approximately 211 square miles of land, and is located entirely within Dutchess County, as shown in Figure 4-3, above. The watershed is fed by 320 miles of tributary streams, creeks, and brooks, including the subwatersheds of Cold Spring Creek, East Branch Wappinger Creek, Great Spring Creek, Grist Mill Creek, Hunns Lake Creek, Little Wappinger Creek, Tamarack Creek, Upton Lake Creek, and Willow Brook. There are approximately 1,694 acres of ponds and lakes and approximately 8,362 acres of wetlands within the watershed's vast territory (CCEDC, 2009).

The Dutchess County municipalities within the watershed, 11 towns and two villages, include: the towns of Pine Plains, Milan, Stanford, Clinton, Washington, Hyde Park, Pleasant Valley, LaGrange, Poughkeepsie, Wappinger, and Fishkill; and the Villages of Millbrook and Wappingers Falls.

### Hudson River Drainage Basin – Fishkill Creek Watershed

The 38 mile long Fishkill Creek and its 338 miles of tributaries drains roughly 193 square miles in Dutchess and Putnam Counties, as shown in Figure 4-3, above. The Fishkill begins in the Town of Union Vale, and outlets into the Hudson River in the City of Beacon. Other Dutchess County municipalities within the watershed include the towns of Washington, Pleasant Valley, LaGrange, Beekman, East Fishkill, Wappinger, Pawling, and Fishkill, and the Village of Fishkill.

The mainstem Fishkill Creek is fed by six main subwatersheds, including Clove Creek, Jackson Creek, Sprout Creek, Whaley Lake Creek, Wiccoppe Creek, and Whortlekill Creek. The watershed is marked by approximately 1,575 acres of lakes and ponds, many of which exceed 20 acres and the largest, Whaley Lake, covering 252 acres (CCEDC, 2009).

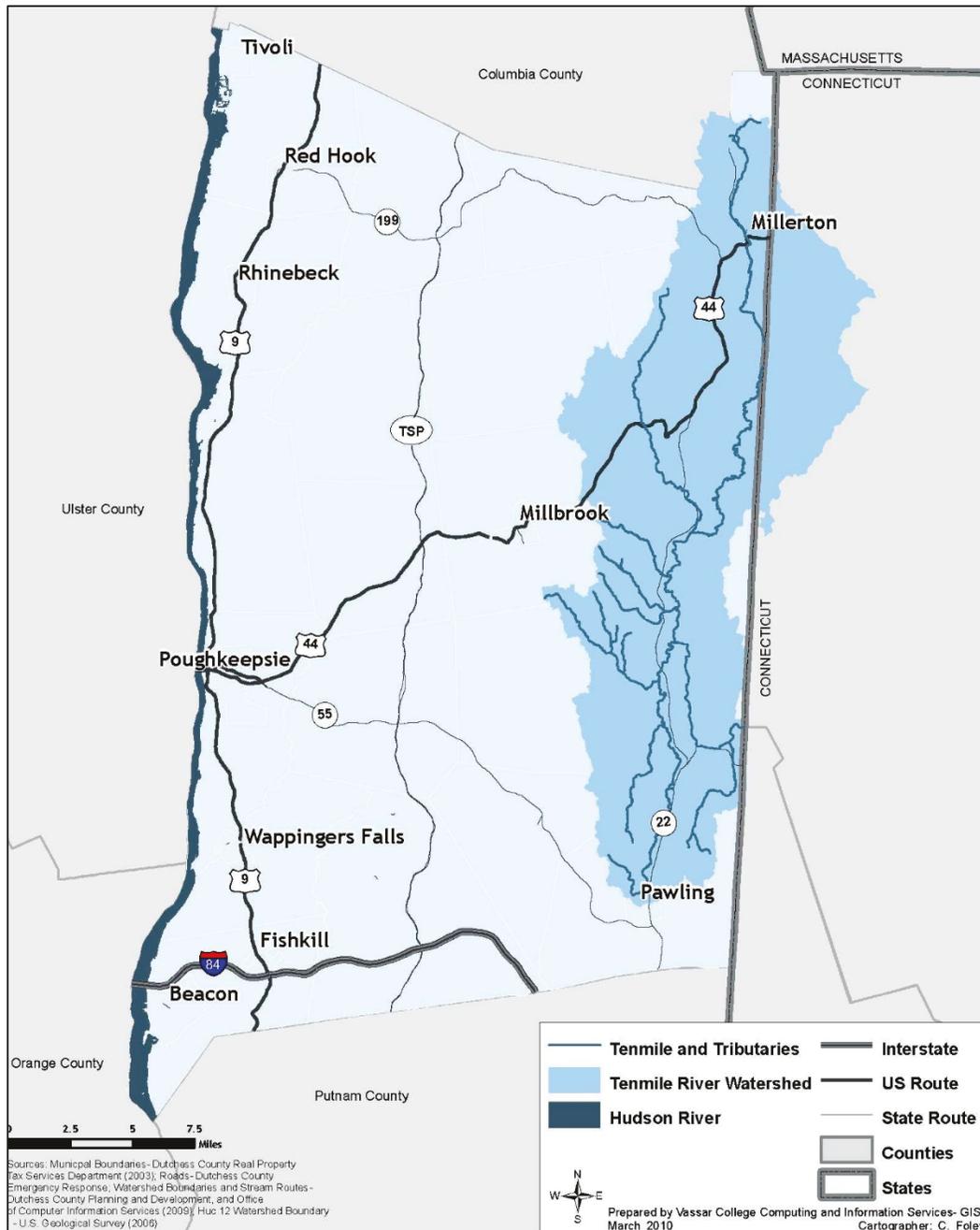
### Tenmile River Watershed

Roughly 25% of Dutchess County drains to the Tenmile River Watershed, accounting for approximately 210 square miles of land. The river runs mostly north to south for its 33 mile length in Dutchess County before emptying into the Housatonic River in Gaylordsville, CT as shown in Figure 4-4, below. Dutchess County towns and villages within the watershed include the towns of Northeast, Pine Plains, Stanford, Amenia, Washington, Dover, Unionvale, Beekman, and Pawling, and the villages of Millerton and Pawling. State Routes 22 and 6 follow the river in several locations along its path.

The Wassiac Creek is the primary tributary on the western side of the Tenmile River Watershed, while the Webatuck Creek contributes from the east and the Swamp River drains the southern portion of the watershed, flowing north into the Tenmile River. These and other subwatersheds draining to the Tenmile River include: Webatuck Creek, Swamp River, Tenmile River, Wassiac Creek, Beaver Brook, Doctors Brook, Butts Hollow Brook, Stone Church Brook, Seven Wells Brook, Mill River, Stony Brook, Burton Brook, and Deuel Hollow Brook (CCEDC, 2009).



Figure 4-4. Tenmile Watershed



Source: CCEDC, 2009 ([http://www.dutchesswatersheds.org/images/dwp/tenmile/tenmile\\_loc.pdf](http://www.dutchesswatersheds.org/images/dwp/tenmile/tenmile_loc.pdf))

### Topography and Geology

According to the 2010 Natural Resource Inventory of Dutchess County, Dutchess County topography is unique among the Mid-Hudson Valley, as the areas of the Hudson Highlands and Taconic Hills are underlain by granites, gneisses, schists, and other hard rocks rather than the soft shale or carbonate bedrock which underlies the rest of the valley, including some valleys in eastern Dutchess County and ridges in the west. These areas underlain by carbonates often form the beds of waterways, as is the case with the Weatuck Creek, Wappinger Creek, and Fishkill Creeks in southwestern Dutchess, all of which flow over carbonate bedrock (CCEDC, 2010).





The other major force influencing Dutchess County storms in the winter months is the polar air movement, which brings masses of cold air southeast from Canada (CCEDC, 2010). Conversely, the county's relative proximity to the Atlantic Ocean at times serves to moderate these severe cold temperatures, leading to slightly milder winter days and cooler summer extremes. The cool season (October through March) is characterized by large, low-pressure systems that move northeastward along the Atlantic coast or the western side of the Appalachian Mountains. Storms that form in these systems are characterized by long periods of steady precipitation in the form of rain, snow, or ice, and tend to produce less surface runoff and more recharge than the summer storms because they have a longer duration and occasionally result in snowmelt (Cornell, Date Unknown). These factors, combined with the region's relatively long freeze-free season compared similar latitudes at greater distances from the coast, contribute to the county's longer growing season and successful agricultural economy (CCEDC, 2010).

Dutchess County generally experiences temperature means of 27.3 degrees Fahrenheit in the winter months, and 69.5 degrees Fahrenheit in the summer. The County's mean annual precipitation ranges from 38 to 46 inches, with an average of 18 to 22 of those inches falling within the growing season (May through September) (CCEDC, 2010).

## Land Use and Land Cover

### Land Use

From its earliest colonial days, much of Dutchess County was cleared for agricultural land uses. Land remained in active farming until the 1940s, when a decline in agricultural activity resulted in the regrowth of forest cover in many parts of the county. Historic aerial photographs provided by the Dutchess County Office of Computer Information Systems indicate that tree cover has increased by roughly 140 percent throughout the county between 1936 and 2000. At the same time that tree cover increased, residential and commercial development began to have an influence on land use throughout the county (Dutchess County Environmental Management Council (EMC), 2012).

The western portion of Dutchess County is located along the Hudson River, and is generally more densely developed and populated than the central and eastern portion. According to the Dutchess County Greenway Compact Program, land use and settlement patterns throughout the county can be characterized into one of three groups: centers, countryside, and suburban. While primary centers of development include traditional hamlets and self-sufficient villages that have historically existed throughout the County, major cities also fall into this group. In Dutchess County, the cities are predominately located along the western county border, adjacent to the Hudson River. In particular, the southwestern portion of the County is home to several cities and densely populated villages. Countryside development, which includes rural areas, farmlands, and forests was once the predominant pattern in Dutchess County. Evidence of these traditional rural land pattern is still evident countywide, but is now concentrated in the northern and central parts of the county. Suburban development is characterized by spread-out, single use areas including single-family residential or highway business districts, and has been the fastest growing of the three development types in Dutchess County for the last 40 years. Suburban development can be found throughout the county, but are most abundant in the west, central, south and southwest parts of the County (Dutchess County Department of Planning and Development (DPD), 2000).

### Land Cover

Total land area in Dutchess County is nearly 802 square miles. The densest residential areas in the County include cities and villages in the southwest portion of the County, while the eastern municipalities remain the least dense.



There are 74,820 acres of protected land in Dutchess County, which includes 31,106 acres of preserved farmland. In total, farmed parcels in Dutchess County occupy over 123,026 acres (almost one quarter of the County’s total land area). The highest concentration of farmland in Dutchess County occurs in the Northeastern towns, including Amenia, Dover, North East, Pine Plains, Stanford, Union Vale, and Washington, where farmed parcels account for more than 50% of the municipalities total land area (Dutchess County Department of Planning and Development (DPD), 2015).

Table 4-1 provides information on the distribution of land use in Dutchess County. Figure 4-6 displays the land use and land cover of the County.

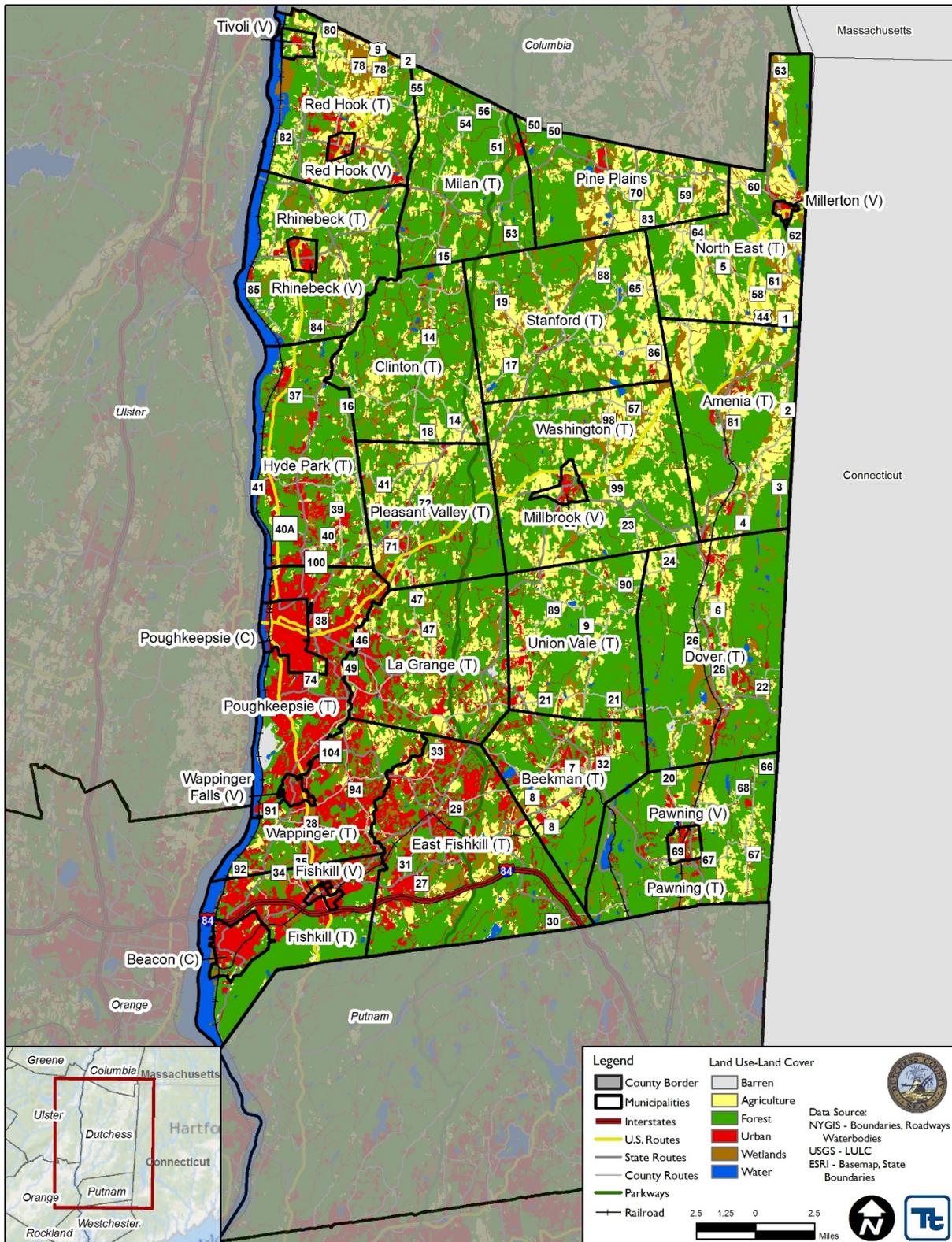
**Table 4-1. Land Cover in Dutchess County**

Land Use Type	Acres	Percent of Total Acreage
Barren Land	1,549.2	0.3%
Cultivated Crops	8,569.9	1.6%
Deciduous Forest	245,139.4	46.4%
Developed, High Intensity	3,393.1	0.6%
Developed, Low Intensity	21,933.7	4.2%
Developed, Medium Intensity	13,988.1	2.7%
Developed, Open Space	40,179.5	7.6%
Emergent Herbaceous Wetlands	7,506.0	1.4%
Evergreen Forest	19,621.0	3.7%
Hay/Pasture	96,977.6	18.4%
Herbaceous	687.8	0.1%
Mixed Forest	7,017.0	1.3%
Open Water	14,978.6	2.8%
Shrub/Scrub	14,195.2	2.7%
Woody Wetlands	32,070.0	6.1%
<b>Total</b>	<b>527,806.1</b>	<b>100%</b>

Source: U.S. Geological Survey (USGS). National Land Cover Database (NLCD), 2011



Figure 4-6. Dutchess County Land Cover



Source: USGS NLCD, 2011





### Agricultural and Undeveloped Land

Characteristic of its agricultural nature, the majority of Dutchess County land use is classified as something other than “developed,” based on categories provided by the US Geological Survey, NASA Landsat Data Collection GS NLDC (USGS NLDC, 2011). Deciduous forest accounts for the most prominent land cover in the county, covering 245,140 acres, or roughly 46% of the entire county. Forested lands exist throughout the county, but are especially the northern towns of Clinton and Milan, as well as the eastern towns of Dover and Pawling. The next largest category is Hay/Pasture, representative of the large agriculture industry in Dutchess County, covering 18.4% of the County’s total land area. Agricultural uses including Hay/Pasture and Cultivated Crops, which accounts for 1.8% of land use county-wide, are heaviest in the central and northeast parts of the county in towns such as Stanford, Washington, Pine Plains, North East, and Amenia. Red Hook and Pleasant Valley, further west, also have significant amounts of agricultural land (USGS NLDC, 2011). In fact, according to the 2015 Dutchess County Agriculture and Farmland Protection Plan, Farmland comprise more than half of the land use in the Dutchess County municipalities of North East, Washington, Stanford, Amenia, Pine Plains, Union Vale, and Dover (Dutchess County Agriculture and Farmland Protection Plan, 2015). Finally, another 18% of the county’s total land area is classified as either Emergent Herbaceous Wetlands, Evergreen Forest, Herbaceous, Mixed Forest, Open Water, Shrub/Scrub, and Woody Wetlands (USGS NLDC, 2011).

### Developed and Urban Land

The Census Bureau classifies ‘urban’ as all territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC). It delineates UA and UC boundaries to encompass densely settled territory, which consist of core census block groups or blocks that have a population density of at least 1,000 people per square mile; and surrounding census blocks that over an overall density of at least 500 people per square mile. An urbanized area is a densely populated area with a population density of more than 1,000 people per square mile and a population of more than 50,000. Urban clusters are defined in the same manner as urbanized areas; however, an urban cluster has a population density of 2,500 people per square mile and a population of more than 50,000 (U.S. Census Bureau, 2015).

Developed land accounts for about 15% of total land in Dutchess County, of which 7.6% is considered to be Developed Open Space (USGS NLDC, 2011). The largest residential populations in Dutchess County are centralized in the south western municipalities, and around the City and Town of Poughkeepsie, the City of Beacon, and the Town of Wappinger Falls. With a population of 297,488 and a population density of 374 people per square mile, Dutchess County is not considered an urban area; however, it is located in the New York-White Plains-Wayne, NY-NJ Metropolitan Statistical Area, which is the most populous metropolitan area in the United States and the fourth most populous in the world (U.S. Census Bureau, 2013).

## 4.2 POPULATION AND DEMOGRAPHICS

According to the 2010 U.S. Census, Dutchess County had a population of 297,488 people which represents approximately a 7% increase from the 2000 U.S. Census population of 277,947 people. The 2010 Census showed that the Town of Poughkeepsie, with a population of 42,399, is the most populated municipality in Dutchess; followed by the City of Poughkeepsie with a population of 32,736. These two municipalities accounted for more than a quarter of the County’s total 2010 population.

HAZUS-MH demographic data will be used in the loss estimation analyses in Section 5 of this plan. All demographic data in HAZUS corresponds to the 2000 U.S. Census data. There was an error in the 2000 U.S. Census that resulted in the Town of Milan having 4,559 residents (Population: 2,356); the HAZUS-MH data reflects this error. Table 4-2 presents the population statistics for Dutchess County based on the 2000 and 2010 U.S. Census data. For the purposes of this plan, the 2010 Census was used where the data was available and supplemented with HAZUS-MH data (representing 2000 data). Figures 4-7 through 4-9 show the distribution



of the general population density (persons per square mile) by 2010 Census block, and persons over the age of 65 and low income by 2000 Census block.

DMA 2000 requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households.

**Table 4-2. Dutchess County Population Statistics**

Municipality	U.S. Census 2012			U.S. Census 2000*				
	Total	Pop. 65+	% Pop. 65+	Total	Pop. 65+	Percent Pop. 65+	Low Income Pop.**	% Low-Income Pop. of Total
Amenia (T)	4,436	780	17.6%	4,048	718	17.7%	253	6.3%
Beacon (C)	15,541	1,824	11.7%	13,808	1,657	12.0%	981	7.1%
Beekman (T)	14,621	1,273	8.7%	11,452	843	7.4%	309	2.7%
Clinton (T)	4,312	664	15.4%	4,010	455	11.3%	104	2.6%
Dover (T)	8,699	976	11.2%	8,565	843	9.8%	418	4.9%
East Fishkill (T)	29,029	3,104	10.7%	25,589	2,111	8.2%	555	2.2%
Fishkill (T)	19,936	3,072	15.4%	18,523	2,336	12.6%	766	4.1%
Fishkill (V)	2,171	343	15.8%	1,735	485	28.0%	215	12.4%
Hyde Park (T)	21,571	3,172	14.7%	20,851	2,626	12.6%	1,045	5.0%
LaGrange (T)	15,730	2,101	13.4%	14,928	1,541	10.3%	417	2.8%
Milan (T)	2,370	346	14.6%	4,559	282	6.2%	103	2.3%
Millbrook (V)	1,452	335	23.1%	1,429	270	18.9%	132	9.2%
Millerton (V)	958	121	12.6%	925	137	14.8%	68	7.4%
Northeast (T)	2,073	363	17.5%	2,077	289	13.9%	126	6.1%
Pawling (T)	6,116	897	14.7%	5,288	752	14.2%	128	2.4%
Pawling (V)	2,347	328	14.0%	2,233	370	16.6%	203	9.1%
Pine Plains (T)	2,473	419	16.9%	2,569	387	15.1%	181	7.0%
Pleasant Valley (T)	9,672	1,167	12.1%	9,066	956	10.5%	414	4.6%
Poughkeepsie (C)	32,736	4,257	13.0%	29,871	4,089	13.7%	4,470	15.0%
Poughkeepsie (T)	42,399	5,854	13.8%	41,800	5,318	12.7%	1,871	4.5%
Red Hook (T)	8,240	1,000	12.1%	7,440	886	11.9%	482	6.5%
Red Hook (V)	1,961	388	19.8%	1,805	239	13.2%	145	8.0%
Rhinebeck (T)	4,891	1,266	25.9%	4,685	920	19.6%	296	6.3%
Rhinebeck (V)	2,657	712	26.8%	3,077	833	27.1%	238	7.7%
Stanford (T)	3,823	528	13.8%	3,544	448	12.6%	121	3.4%
Tivoli (V)	1,118	128	11.4%	1,163	73	6.3%	72	6.2%
Union Vale (T)	4,877	637	13.1%	4,546	429	9.4%	51	1.1%
Wappinger (T)	22,468	2,912	13.0%	22,322	2,214	9.9%	737	3.3%
Wappinger Falls (V)	5,522	750	13.6%	4,929	609	12.4%	432	8.8%



Table 4-2. Dutchess County Population Statistics

Municipality	U.S. Census 2012			U.S. Census 2000*				
	Total	Pop. 65+	% Pop. 65+	Total	Pop. 65+	Percent Pop. 65+	Low Income Pop.**	% Low-Income Pop. of Total
Washington (T)	3,289	587	17.8%	3,313	521	15.7%	163	4.9%
<b>Dutchess County (TOTAL)</b>	<b>297,488</b>	<b>40,304</b>	<b>13.5%</b>	<b>280,150</b>	<b>33,637</b>	<b>12.0%</b>	<b>15,496</b>	<b>5.5%</b>

Source: Census 2010 (U.S. Census Bureau); HAZUS-MH (for 2000 U.S. Census data)

Note: Pop. = population

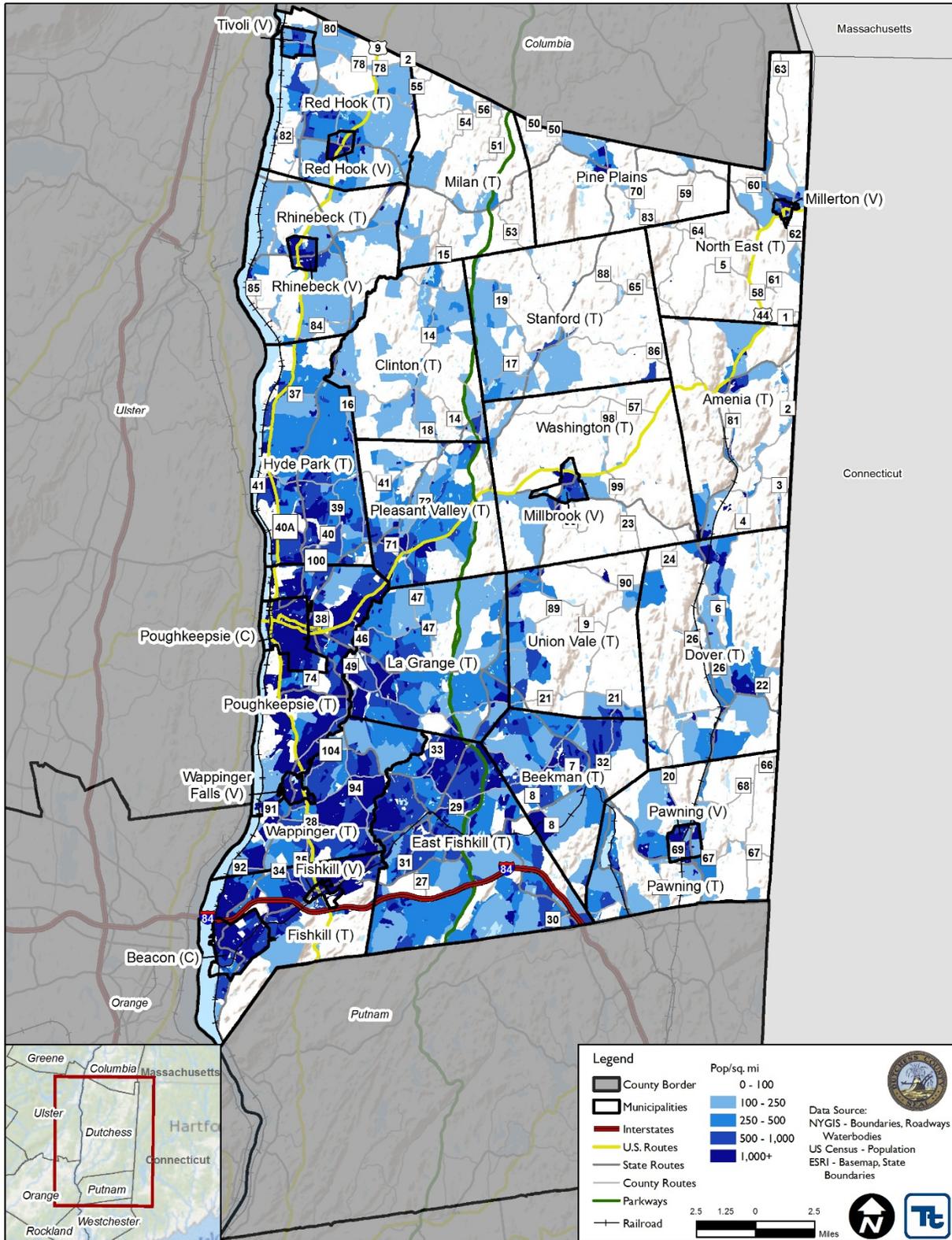
\* Individuals below poverty level (Census poverty threshold for a 3-person family unit is approximately \$18,500)

It is noted that the Census data for household income provided in HAZUS-MH includes two ranges (\$0-10,000 and \$10,000-\$20,000/year) that were totaled to provide the “low-income” data used in this study. This does not correspond exactly with the “poverty” thresholds established by the 2013 U.S. Census Bureau, which identifies households with three adults and no children with an annual household income below \$18,222 per year, or households with one adult and two children with an annual household income below \$18,769 per year as “low income” for this region. This difference is not believed to be significant for the purposes of this planning effort.

The 2012 U.S. Census American Community Survey data identified approximately 17,081 households as having an annual income of less than \$25,000. Figure 4-8 shows the distribution of persons over age 65 in Dutchess County, while Figure 4-9 shows the distribution of low income persons.



Figure 4-7. Distribution of General Population for Dutchess County, New York

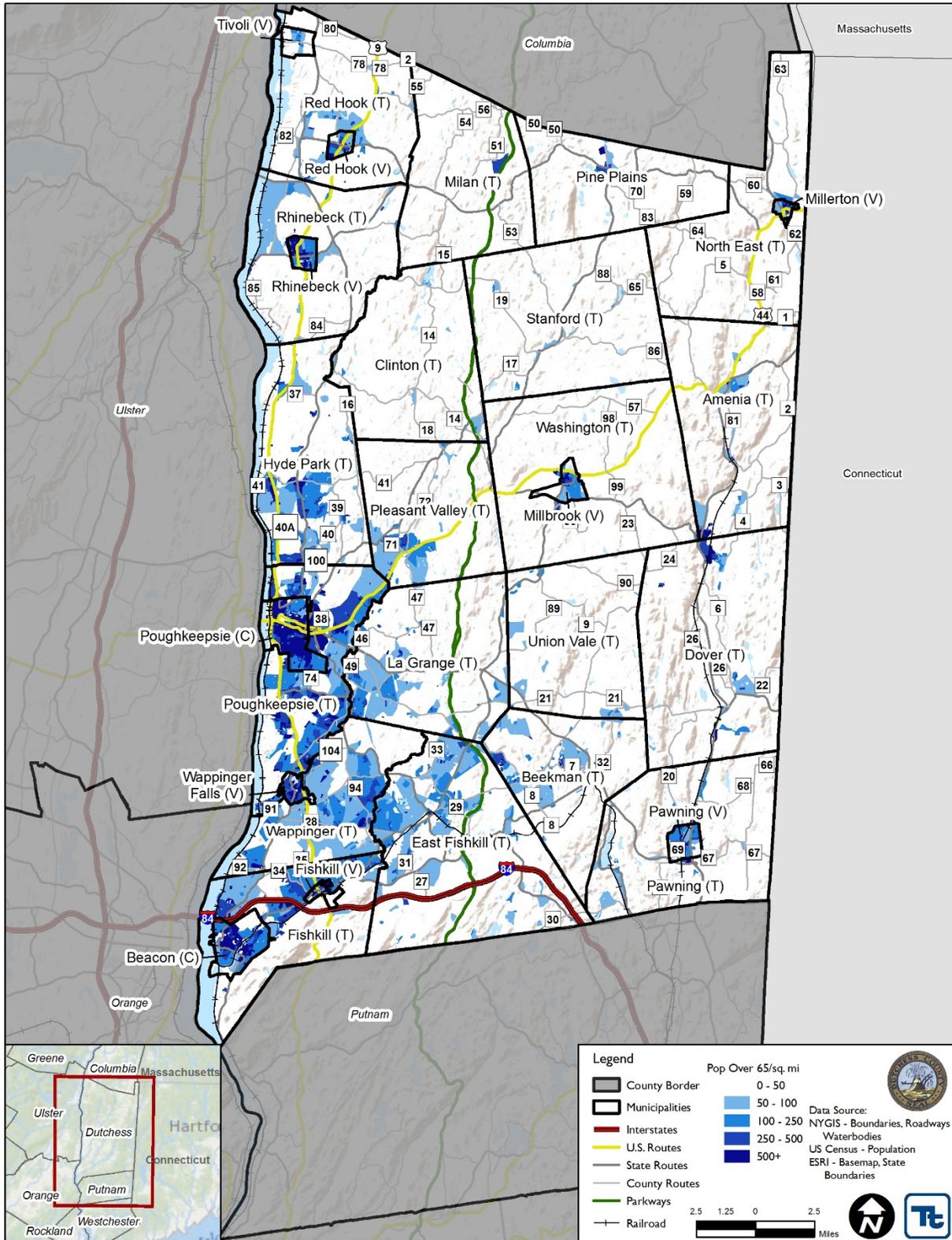


Source: U.S. Census 2010





Figure 4-8. Distribution of Persons over the Age of 65 in Dutchess County, New York

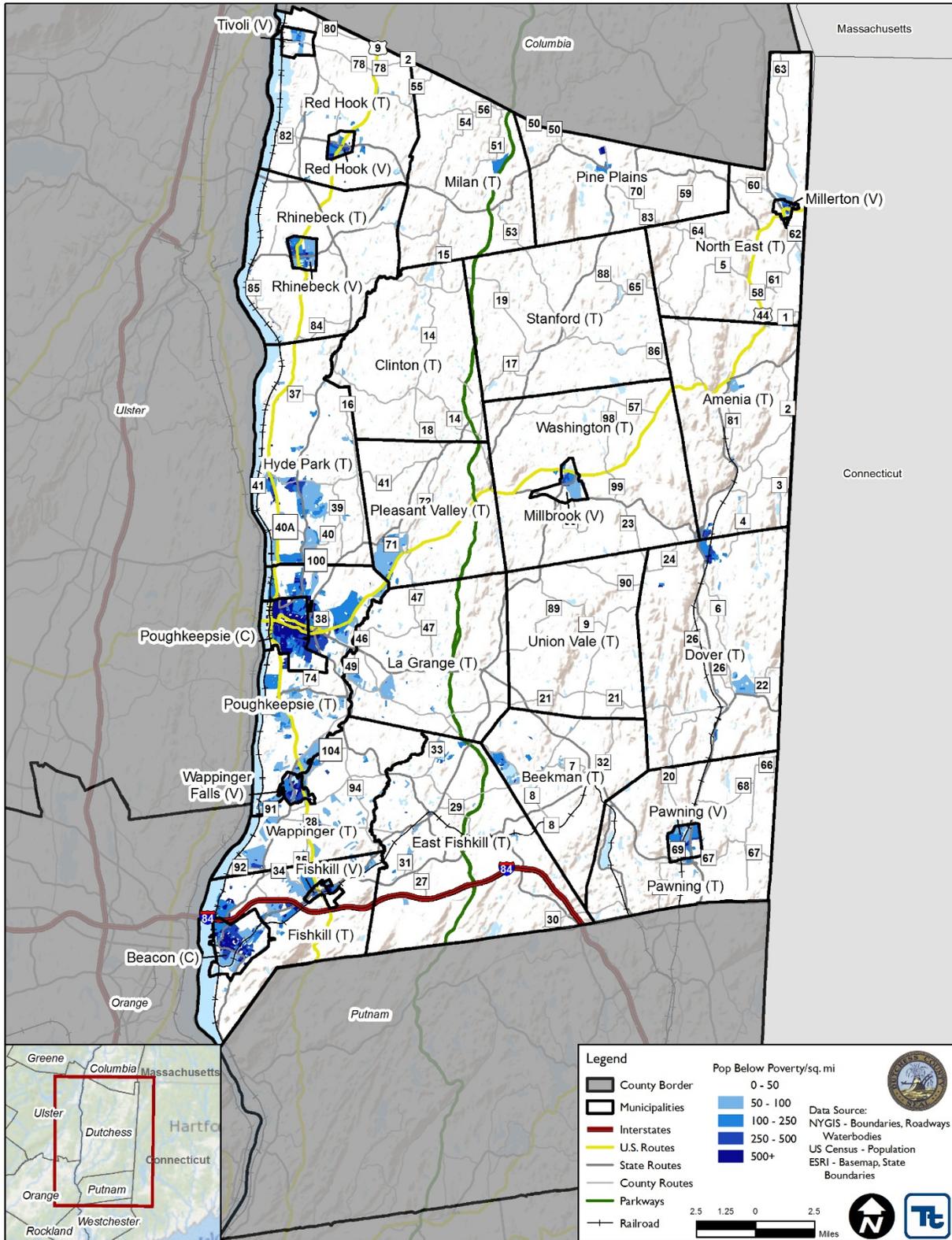


Source: HAZUS-MH





Figure 4-9. Distribution of Low-Income Population in Dutchess County, New York



Source: HAZUS-MH





### 4.3 GENERAL BUILDING STOCK

The 2000 U.S. Census data identified 99,536 households (106,103 housing units) in Dutchess County. The 2010 U.S. Census reported 107,965 households (118,638 housing units) in Dutchess County. The County experienced an increase in both households and housing units from 2000 to 2010. For households, between 2000 and 2010, the County saw an 8.5% increase. As for housing units, the County experienced an increase of 10.6% between 2000 and 2010. The U.S. Census defines household as all the persons who occupy a housing unit, and a housing unit as a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Therefore, you may have more than one household per housing unit. The median price of an owner-occupied housing unit in Dutchess County was estimated at \$289,400 (U.S. Census, 2014).

For this update, the default general building stock in HAZUS-MH was updated and replaced with a custom building inventory for Dutchess County both at the aggregate and structure level. The building stock update was performed using the most current parcel and the New York State Department of Taxation and Finance tax assessment data provided by Dutchess County. The tax assessment data was joined to the spatial layer of structure footprints also provided by the County. The replacement cost value was calculated using the square footage value of each building and RS Means 2014 data.

For the purposes of this plan, there are approximately 119,105 structures identified by the tax data and spatial data available. These structures account for a replacement cost value of approximately \$97.9 billion. Estimated content value was calculated by using 50-percent of the residential replacement cost value, and 100-percent of the non-residential replacement values. Using this methodology, there is approximately \$37.4 billion in contents within these properties. Approximately 89.5% of the total buildings in the County are residential, which make up approximately 70.8% of the total building stock structural. Table 4-3 presents building stock statistics by occupancy class for Dutchess County.

**Table 4-3. Number of Buildings and Improvement Value by Municipality**

Municipality	All Occupancies			
	Count	Estimated Structure RCV	Estimated Contents RCV	Total (Structure + Contents)
Amenia (T)	2,691	\$1,173,643,243	\$769,791,345	\$1,943,434,588
Beacon (C)	4,395	\$2,064,232,682	\$1,279,398,950	\$3,343,631,632
Beekman (T)	5,075	\$2,449,459,966	\$1,375,164,412	\$3,824,624,378
Clinton (T)	3,110	\$1,341,651,069	\$727,871,812	\$2,069,522,881
Dover (T)	4,612	\$1,677,602,978	\$1,103,713,639	\$2,781,316,617
East Fishkill (T)	11,772	\$6,390,057,444	\$3,751,760,762	\$10,141,818,207
Fishkill (T)	5,654	\$3,949,240,855	\$2,662,642,860	\$6,611,883,715
Fishkill (V)	590	\$402,859,104	\$281,565,297	\$684,424,401
Hyde Park (T)	8,593	\$3,781,227,152	\$2,282,501,317	\$6,063,728,469
LaGrange (T)	6,802	\$3,728,775,229	\$2,188,133,413	\$5,916,908,642
Milan (T)	2,086	\$791,142,073	\$439,053,053	\$1,230,195,126
Millbrook (V)	752	\$430,362,334	\$299,044,071	\$729,406,405
Millerton (V)	510	\$200,740,766	\$130,984,566	\$331,725,332
Northeast (T)	1,863	\$872,302,173	\$555,096,529	\$1,427,398,702



Municipality	All Occupancies			
	Count	Estimated Structure RCV	Estimated Contents RCV	Total (Structure + Contents)
Pawling (T)	3,403	\$1,629,501,263	\$937,690,096	\$2,567,191,358
Pawling (V)	882	\$462,892,825	\$314,104,517	\$776,997,342
Pine Plains (T)	1,935	\$800,637,873	\$477,419,057	\$1,278,056,930
Pleasant Valley (T)	4,718	\$1,982,280,592	\$1,129,520,317	\$3,111,800,909
Poughkeepsie (C)	7,829	\$3,982,167,290	\$2,556,532,544	\$6,538,699,835
Poughkeepsie (T)	14,092	\$9,077,634,548	\$6,206,305,263	\$15,283,939,811
Red Hook (T)	3,996	\$1,967,030,033	\$1,192,598,613	\$3,159,628,647
Red Hook (V)	930	\$465,279,056	\$309,621,362	\$774,900,418
Rhinebeck (T)	3,217	\$1,564,600,397	\$899,883,076	\$2,464,483,474
Rhinebeck (V)	1,303	\$699,038,933	\$458,870,331	\$1,157,909,263
Stanford (T)	3,192	\$1,361,285,639	\$752,598,004	\$2,113,883,643
Tivoli (V)	488	\$222,466,402	\$117,584,926	\$340,051,328
Union Vale (T)	2,509	\$1,311,718,689	\$782,054,962	\$2,093,773,650
Wappinger (T)	7,899	\$3,652,165,422	\$2,134,924,492	\$5,787,089,913
Wappinger Falls (V)	1,395	\$689,593,231	\$463,863,647	\$1,153,456,878
Washington (T)	2,812	\$1,392,014,229	\$831,459,326	\$2,223,473,555
<b>Dutchess County (TOTAL)</b>	<b>119,105</b>	<b>\$60,513,603,490</b>	<b>\$37,411,752,558</b>	<b>\$97,925,356,049</b>

Source: Dutchess County, 2014

Notes: RCV = Replacement cost value.

**Table 4-4. Number of Buildings and Total Replacement Value by Occupancy Class**

Municipality	Residential		Commercial		Industrial	
	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)
Amenia (T)	2,183	\$1,211,555,694	171	\$377,780,828	30	\$60,961,603
Beacon (C)	4,067	\$2,354,501,193	212	\$531,901,966	35	\$203,521,985
Beekman (T)	4,639	\$3,222,886,663	241	\$266,504,070	14	\$11,305,626
Clinton (T)	2,893	\$1,841,337,770	57	\$66,740,482	6	\$12,742,148
Dover (T)	3,909	\$1,721,668,020	406	\$585,657,115	80	\$175,616,680
East Fishkill (T)	10,940	\$7,914,890,047	374	\$648,537,870	220	\$1,190,833,560
Fishkill (T)	5,018	\$3,859,793,987	452	\$2,258,158,475	75	\$147,882,199
Fishkill (V)	446	\$363,881,421	116	\$265,307,852	8	\$14,099,457
Hyde Park (T)	7,904	\$4,496,177,507	445	\$689,371,289	31	\$40,228,399
LaGrange (T)	6,198	\$4,621,925,447	330	\$732,155,161	37	\$55,851,346
Milan (T)	1,839	\$1,056,267,061	55	\$39,000,392	12	\$12,038,001
Millbrook (V)	587	\$393,954,787	71	\$98,970,539	7	\$6,725,069
Millerton (V)	405	\$209,268,598	80	\$72,002,698	8	\$25,720,917
Northeast (T)	1,466	\$951,616,933	90	\$80,636,335	7	\$19,306,423





Municipality	Residential		Commercial		Industrial	
	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)
Pawling (T)	3,016	\$2,075,433,500	208	\$293,444,449	10	\$28,624,303
Pawling (V)	735	\$446,364,926	60	\$72,078,246	18	\$82,124,857
Pine Plains (T)	1,673	\$969,656,447	136	\$158,456,948	10	\$13,789,299
Pleasant Valley (T)	4,265	\$2,558,280,824	288	\$326,395,353	12	\$11,947,822
Poughkeepsie (C)	7,113	\$4,276,904,238	522	\$1,428,896,175	65	\$279,212,873
Poughkeepsie (T)	12,667	\$8,613,987,855	773	\$3,421,840,680	162	\$1,087,505,954
Red Hook (T)	3,443	\$2,323,294,261	131	\$176,340,589	14	\$15,995,345
Red Hook (V)	794	\$466,973,084	84	\$129,962,668	5	\$14,747,909
Rhinebeck (T)	2,821	\$1,994,151,964	189	\$247,645,967	17	\$31,246,540
Rhinebeck (V)	1,123	\$720,505,806	142	\$343,368,678	6	\$5,068,738
Stanford (T)	2,902	\$1,826,062,904	54	\$42,357,280	15	\$16,049,245
Tivoli (V)	460	\$314,644,428	16	\$10,532,212	2	\$780,212
Union Vale (T)	2,176	\$1,588,991,181	112	\$135,773,507	40	\$67,674,603
Wappinger (T)	7,407	\$4,551,722,791	347	\$843,777,835	55	\$141,811,242
Wappinger Falls (V)	1,215	\$677,188,750	131	\$292,663,494	14	\$122,610,192
Washington (T)	2,270	\$1,681,664,710	84	\$124,394,348	5	\$6,234,500
<b>Dutchess County (TOTAL)</b>	<b>106,574</b>	<b>\$69,305,552,795</b>	<b>6,377</b>	<b>\$14,760,653,499</b>	<b>1,020</b>	<b>\$3,902,257,046</b>

Source: Dutchess County, 2014

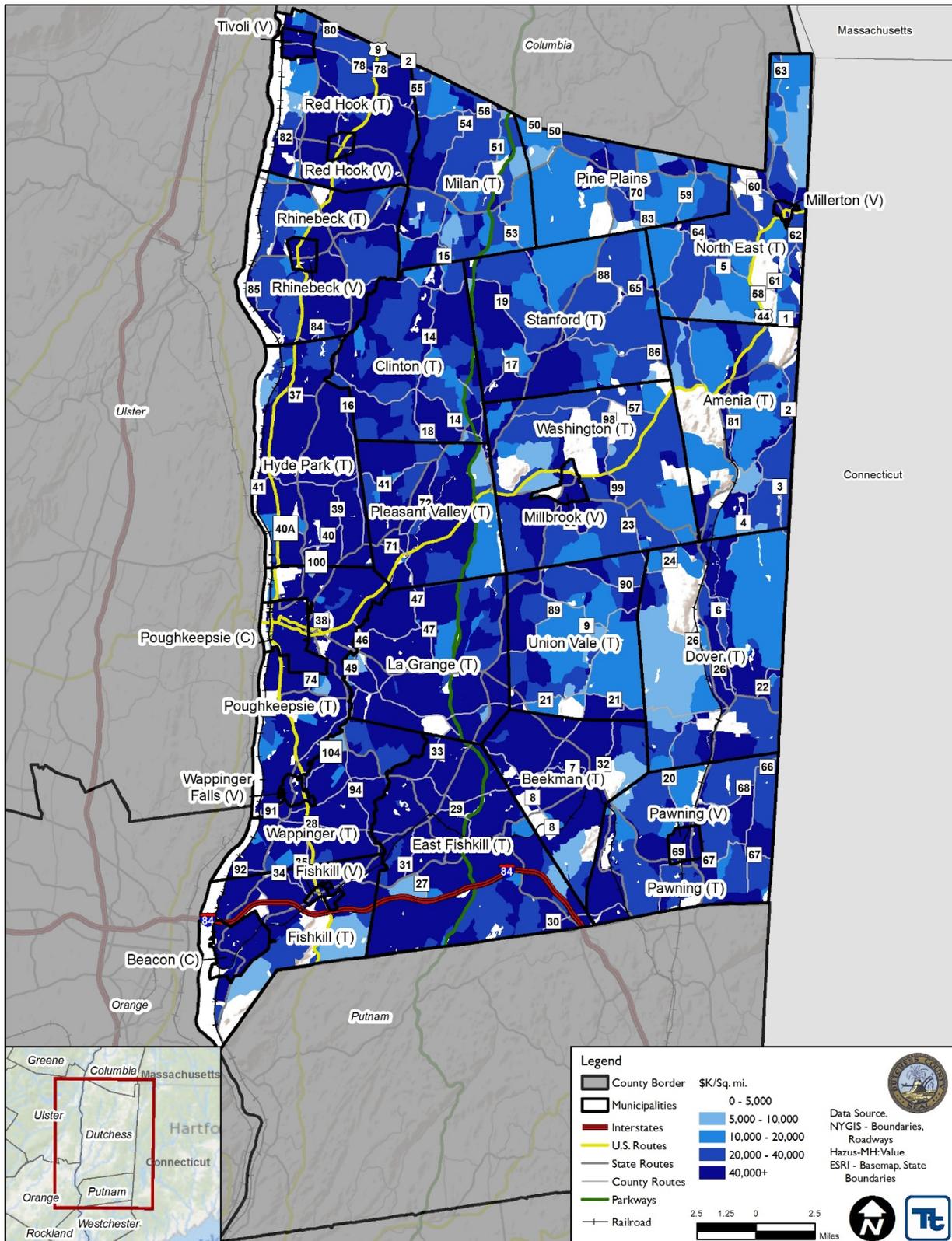
Notes: Industrial includes buildings associated with public utilities parcels (categorized as IND5) - 44% of total

The 2013 American Community Survey data identified that the majority of housing units (63.2% or 74,935 units) in Dutchess County are single-family detached units. The 2012 U.S. Census Bureau’s County Business Patterns data identified 7,488 business establishments employing 91,392 people in Dutchess County. The retail trade industry has the most number of establishments in the County, with 1,049 establishments. This is followed by the construction industry with 1,033 establishments and the health care and social assistance industry with 903 establishments (U.S. Census, 2012).

Figure 4-10 through Figure 4-12 show the distribution and exposure density of residential, commercial and industrial buildings in Dutchess County based on the New York State Department of Taxation and Finance Property Class Code. Exposure density is the dollar value of structures per unit area, including building content value. Generally, contents for residential structures are valued at about 50 percent of the building’s value. For commercial facilities, the value of the content is generally about equal to the building’s structural value. Actual content value varies widely depending on the usage of the structure. The densities are shown in units of \$1,000 (\$K) per square mile. Viewing exposure distribution maps, such as Figure 4-10 through Figure 4-12 can assist communities in visualizing areas of high exposure and in evaluating aspects of the study area in relation to the specific hazard risks.



Figure 4-10. Distribution of Residential Building Stock and Value Density in Dutchess County

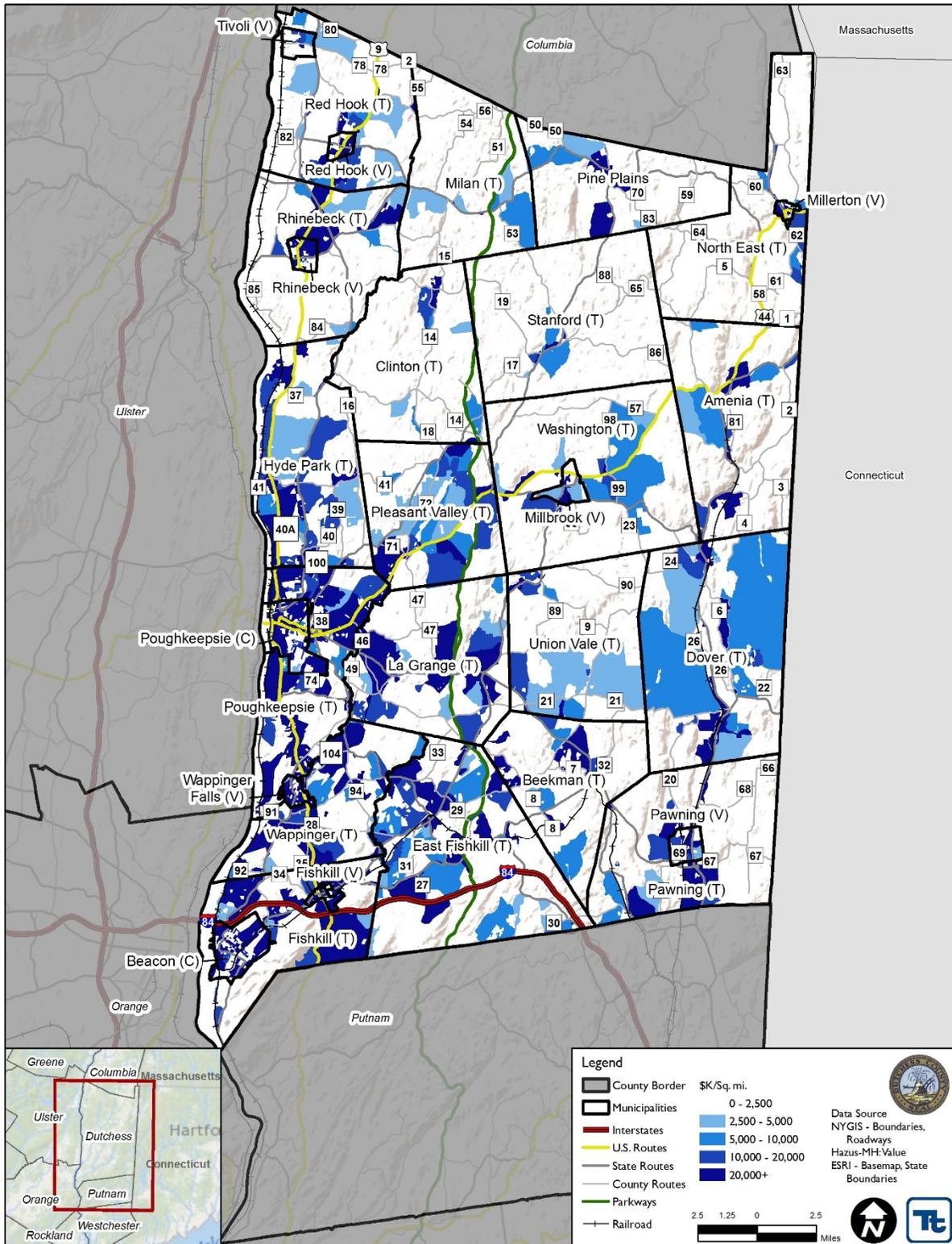


Source: HAZUS-MH 2.1





Figure 4-11. Distribution of Commercial Building Stock and Exposure Density in Dutchess County

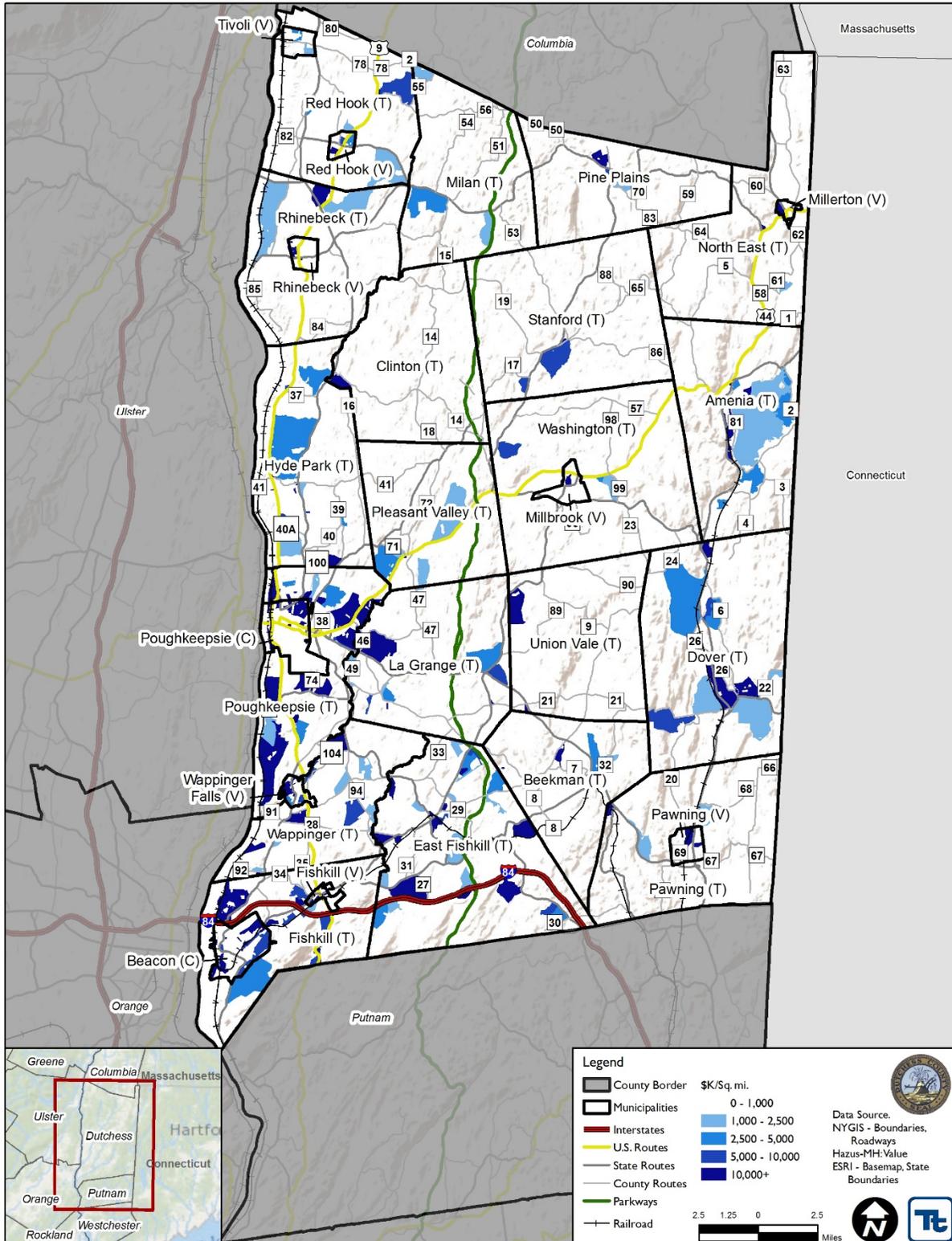


Source: HAZUS-MH 2.1





Figure 4-12. Distribution of Industrial Building Stock and Value Density in Dutchess County



Source: HAZUS-MH 2.1

Note: Buildings associated with public utilities are listed as IND5 – 21.4% of total value





## 4.4 LAND USE AND POPULATION TRENDS

In New York State, land use regulatory authority is vested in towns, villages, and cities. However, many development and preservation issues transcend local political boundaries. DMA 2000 requires that communities consider land use trends, which can impact the need for, and priority of, mitigation options over time. Land use trends can also significantly impact exposure and vulnerability to various hazards. For example, significant development in a hazard area increases the building stock and population exposed to that hazard.

This plan provides a general overview of population and land use and types of development occurring within the study area. An understanding of these development trends can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

### 4.4.1 Land Use Trends

A report published in 2012 by the Dutchess County Environmental Management Council (EMC) titled the State of the Environment Report presents data and information on the present state of land use and the environment in Dutchess County. The following will provide a summary of land use trends, as presented in the plan. However, for detailed information regarding land use trends in the County, contact the Dutchess County Department of Planning and Development, <http://www.co.dutchess.ny.us/CountyGov/Departments/Planning/PLIndex.htm>.

Over the past 60 years, land use trends in Dutchess County have been centered on the expansion of developed areas of housing, commercial and transportation activities. These trends had both positive and negative impacts on the County. Some new development and redevelopment have strengthened the County's municipal centers, as well as waterfront areas, but the largest share has occurred away from urban centers. Meanwhile, recent efforts towards open space protection has preserved important natural resources, productive agricultural areas, and scenic features in the County (Dutchess County EMC, 2012).

One of the most significant trends in Dutchess County land use has been the increase of residential development of larger parcels, larger homes, and at a further distance from established urban and job centers. Since the beginning of the 21<sup>st</sup> century, approximately one-third of new houses in Dutchess County have been constructed on lots of two acres or larger. The most immediate impact of this trend is the loss of forested land (Dutchess County EMC, 2012).

### 4.4.2 Population Trends

This section discusses population trends to use as a basis for estimating future changes of the population and significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

According to the U.S. Census Bureau Dutchess County's 2010 population was 297,488 persons, which is 6.2% increase from the 2000 Census population of 280,150. From 1940 to 1970, the County experienced significant growth of up to 28.7% (between 1950 and 1960). Growth slowed to 9.6% in the 1970s, and again in the 1980s to 5.9%, then increased slightly from 1990 to 2000 to 8%, before another lag in the new millennium. Table 4-4 displays the population and change in population from 1900 to 2010 in Dutchess County.



**Table 4-4. Dutchess County Population Trends, 1940 to 2010**

Year	Population	Change in Population	Percent (%) Population Change
1940	120,542	---	---
1950	136,781	16,239	13.5%
1960	176,008	39,227	28.7%
1970	223,602	47,594	27.0%
1980	245,055	21,453	9.6%
1990	259,462	14,407	5.9%
2000	280,150	20,688	8.0%
2010	297,488	17,338	6.2%

Source: Dutchess County Profile, Cornell University, 2013

Over the next three decades, including the current decade of 2015-2020, Dutchess County has a projected average population growth of 2.04% percent, with the rate of growth declining with each subsequent half-decade. Based on projections from the Cornell University Program on Applied Demographics, the County population is expected to reach 309,985 by 2020 and 326,402 by 2040 as shown in Table 4-5 and Figure 4-13 (U.S. Census, 2010; Cornell University, 2015).

**Table 4-5. Dutchess County Population Projections, 2010 to 2040**

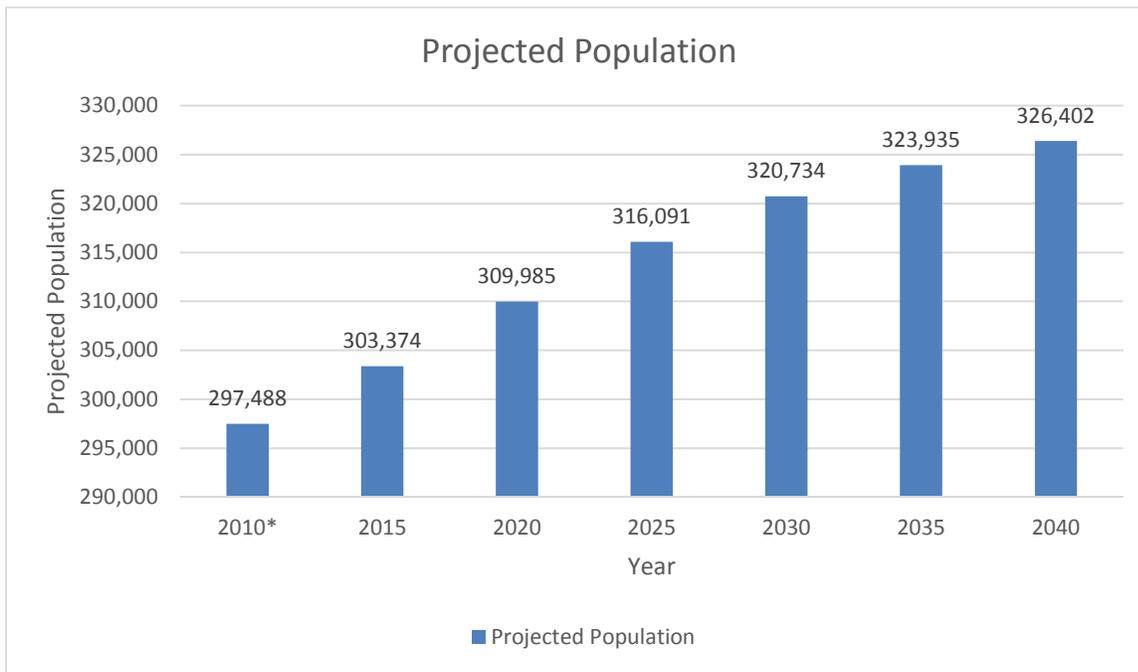
Year	Projected Population	Change in Population	Percent (%) Population Change
2010*	297,488	N/A	N/A
2015	303,374	5,886	1.94%
2020	309,985	6,611	2.13%
2025	316,091	6,106	1.93%
2030	320,734	4,643	1.45%
2035	323,935	3,201	0.99%
2040	326,402	2,467	0.76%

Source: U.S. Census 2010; Cornell University 2015 (<https://pad.human.cornell.edu/counties/projections.cfm>)

\* Actual population from 2010 Census



Figure 4-13. Dutchess County Population Projections, 2010 to 2040



Source: U.S. Census 2010; Cornell University 2015  
 Note: Population for 2010 is the actual 2010 Census population

### 4.4.3 Future Growth and Development

An understanding of population and development trends can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure. DMA 2000 requires that communities consider land use trends, which can impact the need for, and priority of, mitigation options over time. Land use and development trends significantly impact exposure and vulnerability to various hazards. For example, significant development in a hazard area increases the building stock and population exposed to that hazard.

Local zoning and planning authority is provided for under the New York State General Municipal Law, which gives municipalities zoning and planning authority. Refer to Sections 6 and 9 for further details on the planning and regulatory capabilities for the County and each municipality.

The 2010 Census reported that there were 12,535 new housing units built between 2000 and 2010, which translates into an average increase of 1,250 new units per year, or a 1.2 percent annual increase. Over that same period of time, 29 municipalities saw increases in total housing units, with only the Village of Rhinebeck losing units. Municipalities that experienced major population growth also saw sharp increases in the number of housing units. At 31.4 percent and 30.5 percent growth, the Towns of Fishkill and Union Vale had the largest percent increases in housing, respectively (Poughkeepsie-Dutchess County Transportation Council (PDCTC), 2013).

The Dutchess County Transportation Council maintains a Major Projects database to track significant development throughout the County, including projects of 25 or more residential units or more than 25,000 square feet of non-residential gross floor area in urban and suburban areas, and projects of 10 or more residential units of 10,000 square feet of non-residential gross floor area in rural areas (PDCTC, 2013).



The Council's 2010 Major Projects Report showed the most development proposals occurring in the southern and central portions of the County. Over 1,000 proposed housing units were proposed in the Towns of Dover, East Fishkill, Fishkill, Hyde Park, LaGrange, Pine Plains, and Poughkeepsie, accounting for over 77 percent of all proposed residential units County-wide. The southern and central parts of the County also saw the most non-residential development proposals, with proposals in the Towns of East Fishkill and Hyde Park accounting for 44 percent of the County total, combining for over 3.2 million square feet of new development. The City of Beacon and Towns of Dover, LaGrange, Pawling, and Poughkeepsie each had more than 400,000 square feet of proposed non-residential space proposed (PDCTC, 2013).

However, the report also notes an overall decrease in the rate of non-residential development in Dutchess County. Compared to 2009, there was a 1.1% decrease in proposed non-residential projects. The Dutchess County Department of Planning and Development also reviews a portion of local development applications and land use actions, and released data that supports an observation of slowed development activity in the County. The number of proposals processed by the Department in 2010 was 513, an 18 percent decrease from the 627 processed in 2000 (PDCTC, 2013).

Within the jurisdictional annexes in Section 9, the County and participating municipalities have identified development that has occurred in the last five years and potential future development in the next five years, along with the development's exposure to natural hazards.



## 4.5 CRITICAL FACILITIES

A comprehensive inventory of critical facilities in Dutchess County was developed from various sources including input from the Planning Committees. The inventory of critical facilities presented in this section represents the current state of this effort at the time of publication of the HMP and was used for the risk assessment in Section 5.

### 4.5.1 Essential Facilities

This section provides information on emergency facilities, hospital and medical facilities, schools, shelters and senior care and living facilities.

#### Emergency Facilities

The Dutchess County Department of Emergency Response assists the Emergency First Responders of Dutchess County and local municipalities to prepare and respond to natural and man-made emergencies in their communities. The department is composed of numerous divisions, including the Communications Division, Critical Incident Response Team, Emergency Management, EMS Division, Fire and Rescue, Hazardous Materials Response Team, and Medical Reserve Corps, among others. The Department is responsible for aiding communities in emergency planning and response, as well as providing the training and equipment for the County’s first responders and volunteers (Dutchess County Department of Emergency Response, 2015). Additionally, the Department operates an emergency operations center (EOC) in the Town of Poughkeepsie, and a 24-hour 911 Communications Center.

*Critical facilities* are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities and hazardous material facilities.

*Essential facilities* are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the County risk assessment, this category was defined to include police, fire, EMS, EOCs, schools, shelters, senior facilities and medical facilities.

*Emergency Facilities* are for the purposes of this Plan, emergency facilities include police, fire, emergency medical services (EMS) and emergency operations centers (EOC).

#### Police, Fire, and Hospitals

All of the County’s municipalities are serviced by one or more of their own fire departments, resulting in over 80 Fire Station Facilities throughout the County (Dutchess County, NYGIS, 2015). Police enforcement and public safety is also maintained by 31 local departments, with support from the New York State Police Department and Dutchess County Sherriff’s Office (Dutchess County Sherriff’s Office, 2015). The County also has four hospitals and multiple health care facilities; these facilities range in size and primary function that include mobile life support services and ambulance corps, as well as regional hospitals such as the MidHudson Regional Hospital in the Town of Poughkeepsie and the Northern Dutchess Hospital in the Town of Rhinebeck (Dutchess County, NYGIS, 2015).

#### Schools

Over 70 public schools and 36 private schools are located throughout the County. This does not include the additional seven post-secondary educational institutions in the County (Dutchess County, NYGIS, 2015). In times of need, schools can function as shelters and are an important resource to the community.

#### Senior Facilities

The Dutchess County Office for The Aging has a system of programs and services for the senior population, including information and resources on senior housing, transportation, recreation, and legal services. Dutchess County Office for the Aging produces a publication of several forms of housing for senior citizens in Dutchess County, listing 30 facilities of either subsidized senior housing or low-income tax credit properties (Dutchess

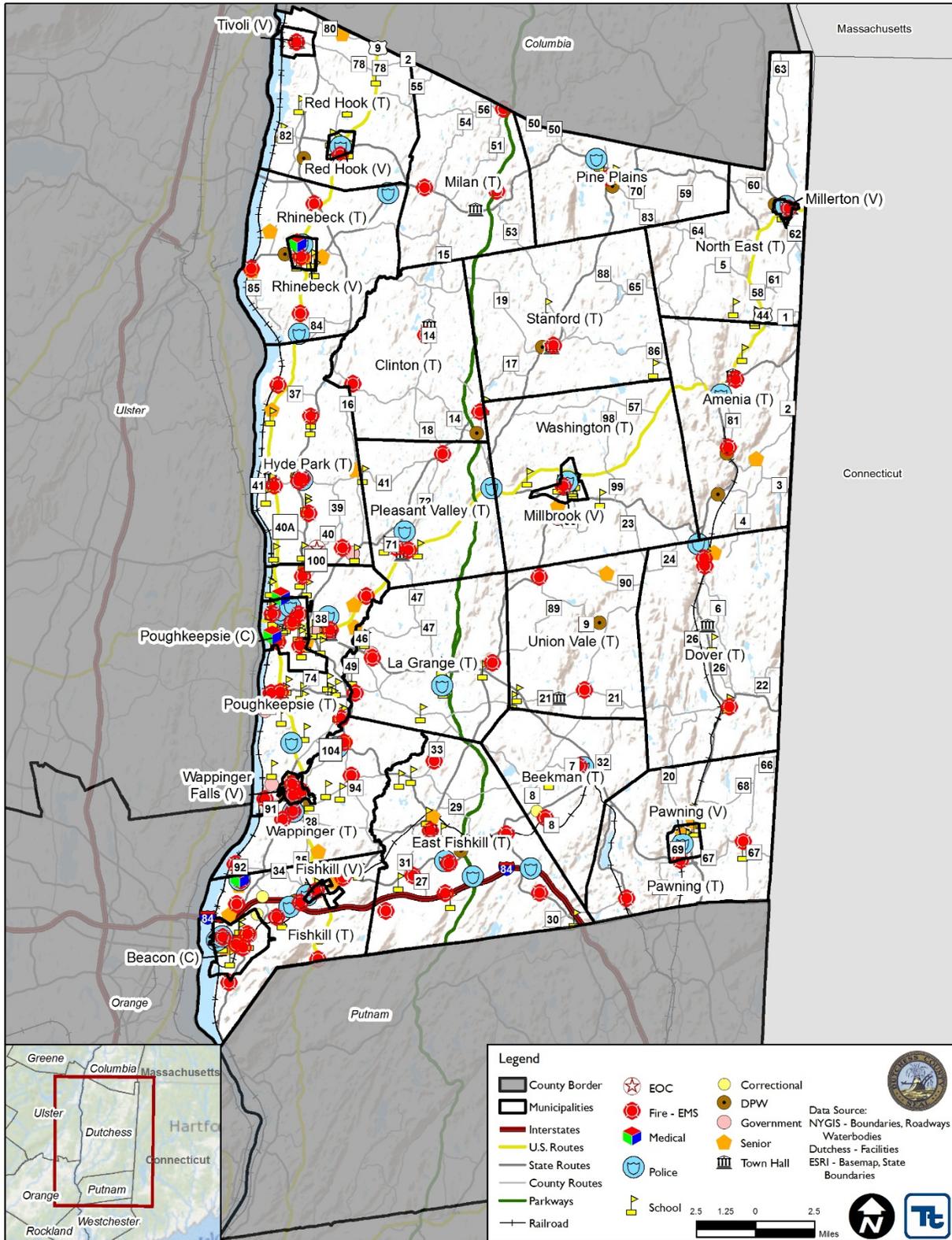


County Office for the Aging, 2015). These facilities are highly vulnerable to potential impacts from disasters, and knowing the location and numbers of these types of facilities will be effective in managing a response plan pre- and post-disaster.

For the purposes of this Plan, emergency facilities include police, fire, emergency medical services (EMS) and emergency operations centers (EOC). Figure 4-15 provides an inventory of these emergency facilities in Dutchess County.



Figure 4-14. Emergency Facilities in Dutchess County



Source: Dutchess County, NYGIS





## 4.5.2 Transportation Systems

Dutchess County's location and extensive transportation network offer residents and employees various options for transportation throughout the County and the region. The County's close proximity to the New York City metropolitan region is one of its most important assets. Dutchess County's transportation system includes an extensive network of roads, bridges, bus routes, rail lines, sidewalks, and trails (PDCTC, 2013). Figure 4-16 shows the regional transportation systems found in Dutchess County.

The County has over 2,480 miles of public roadways, 69 percent of which is under local city, town, and village jurisdiction. County roads such as CR 93 (Myers Corners Rd), State highways such as Routes 22 and 55, and major interstate highways including Interstate 84 and the Taconic State Parkway make up another 30 percent of total (PDCTC, 2013).

In addition to the surface roadways, Dutchess County contains 360 bridges with a span more than 20 feet long. Roughly 75 percent of these structures are owned and/or maintained by NYSDOT and Dutchess County, while the remaining 75 percent are the responsibility of other entities including local municipalities, the New York State Bridge Authority (NYSBA), and the National Park Service (NPS). In a 2013 report, the Dutchess County Transportation Council noted that 42 percent of bridges in the County were classified as deficient under the NYSDOT, indicating that those bridges are deteriorated to a level that requires corrective maintenance or rehabilitation to restore the bridge to a fully functional, non-deficient condition. However, these ratings do not account for damage caused by Tropical Storm Irene in 2011 (PDCTC, 2013).

Since the County's transportation system is an inter-related, multi-jurisdictional network, it is useful to first discuss it in terms of corridors. The Dutchess County Transportation Council's 2013 Moving Dutchess Plan presents the county's transportation network in terms of three primary corridors as the key paths for travel throughout the county: the Hudson, Mid-County, and Harlem Valley corridor.

The most robust transportation system in the County is the Hudson Corridor, which traverses the western edge of the County alongside the Hudson River and has led to the development of densely populated centers in Beacon and Poughkeepsie. The corridor contains the heaviest concentration of transportation activity in the county, with three major north-south highways (Routes 9, 9D, and 9G), passenger rail service (Amtrak and Metro-North Railroad), and a large amount of local and regional bus service (Dutchess County LOOP and City of Poughkeepsie Transit). The New York State Bridge Authority also maintains three bridges in the Hudson Corridor that connect Dutchess to Orange and Ulster counties (the Newburgh-Beacon Bridge, Mid-Hudson Bridge, and Kingston-Rhinecliff Bridge) (PDCTC, 2013).

The Mid-County Corridor runs through less urbanized parts of Dutchess County, serving rural and agricultural areas in the north and suburban developments in the south. This corridor has expanded in the past twenty years to meet growing demands from both residential population and industrial/manufacturing growth in the central portion of the County. The Taconic State Parkway (TSP) is the most frequently travelled north-south connection in this corridor, serving commuters accessing areas around New York City, but excluding commercial truck traffic. Interstate-84 and Routes 44, 52, 55, 199, and 376 are the primary east-west connections in the Mid-County Corridor, and the Dutchess County LOOP bus system provides service along some parts of the corridor (PDCTC, 2013).

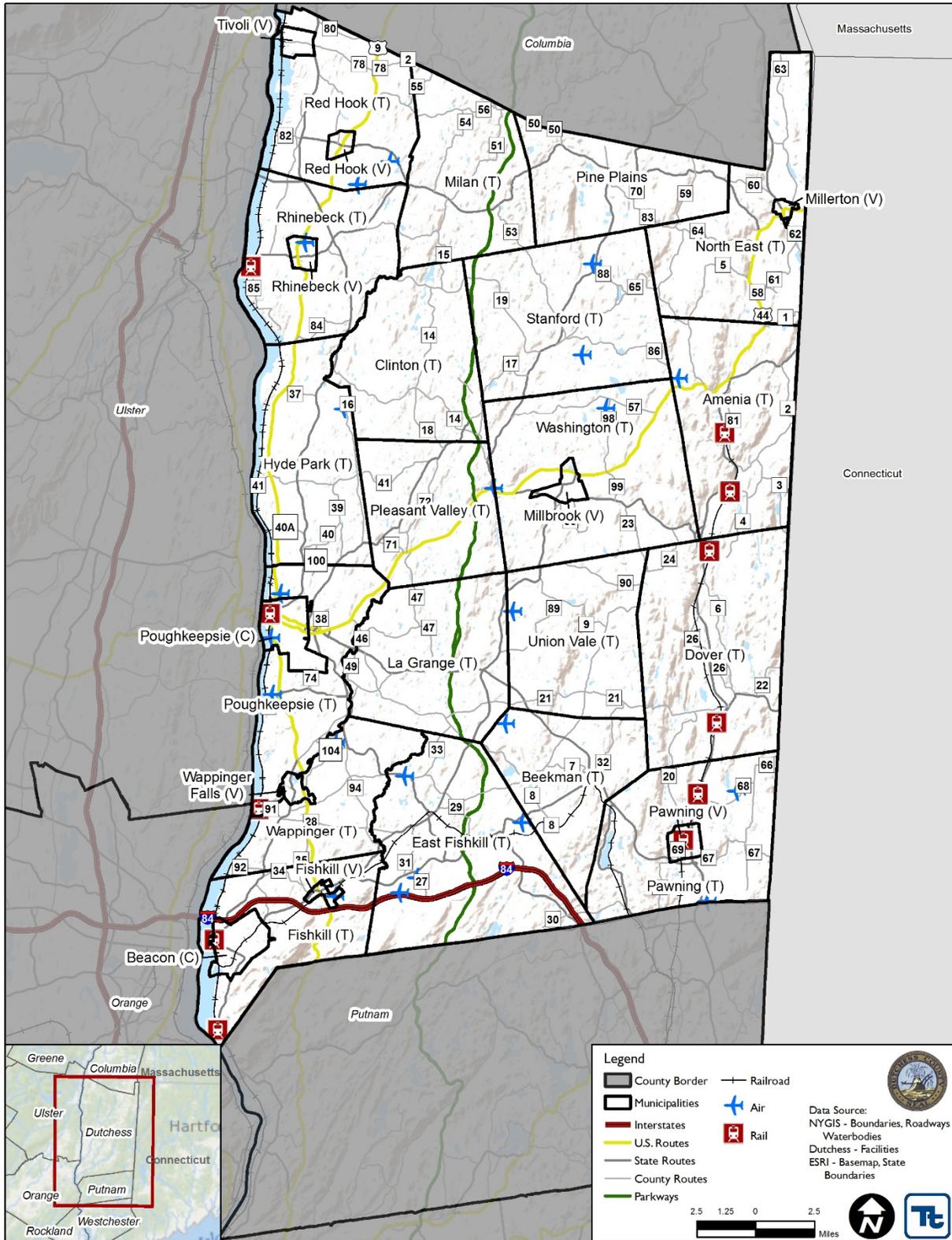
Finally, the Harlem Valley corridor covers the eastern-most portion of the County, spanning largely through rural communities with pockets of denser residential and commercial development. North-south travel is predominately served by Route 22, while Routes 44, 55, 199, and 343 provide east-west connections to Connecticut. Service to New York City and White Plains from this area is provided by Metro-North from five stations on the Harlem Line, and Dutchess County LOOP provides bus service to some Harlem Valley



communities. For cyclists and pedestrians, the Harlem Valley Rail Trail connects the Wassaic train station to the Village of Millerton, and will ultimately connect north into Columbia County (PDCTC, 2013).



Figure 4-15. Transportation Facilities in Dutchess County



Source: Dutchess County, NYGIS





### Bus and Other Transit Facilities

Numerous bus and rail transit services are available in Dutchess County, offering convenient access to destinations in the New York City metro area and other transit-oriented job centers by offering diverse transportation alternatives to the private automobile. Unfortunately, the transit networks are not evenly distributed throughout the county, but rather are concentrated in the southern and western portions where population densities are greater.

Dutchess County LOOP Bus System is run by the County’s Department of Transportation and provides fixed-route service along major corridors from areas of dense population to major activity centers. The LOOP’s six routes, detailed in Table 4-6 below, operate along Routes 9, 9D, 44, 52, and 55 from Monday through Saturday, with the exception of Route F which does not operate on Saturdays (PDCTC, 2013).

**Table 4-6. Dutchess County LOOP Bus Routes**

Route	Primary Service Areas
Route A	Poughkeepsie-Wappingers Falls-Fishkill
Route B	Poughkeepsie-Wappingers Falls-Beacon
Route C	Poughkeepsie-Hyde Park-Rhinebeck-Tivoli
Route D	Poughkeepsie-Millbrook-Wassaic-Dover
Route E	LaGrange-Union Vale-Beekman-Pawling
Route F	Beacon-Fishkill-Hopewell Junction

Source: Dutchess County Transportation Council, 2013

Supplementing the fixed routes to meet peak hour commuter needs, the LOOP system operates three RailLink lines with bus service to the Poughkeepsie, New Hamburg, and Beacon train stations. These routes connect riders with peak hour commuter trains operated by Metro-North Railroad. LOOP also provides three non-fixed route bus services called ADA Paratransit, Dial-a-Ride, and Flex Service (PDCTC, 2013).

The City of Poughkeepsie is the only Dutchess County municipality to offer its own bus service, fueled by the areas high population density and proximity to major activity centers. The Poughkeepsie systems operates six fixed routes with Monday through Friday service (PDCTC, 2013).

### Railroad Facilities

There are two types of rail systems in Dutchess County: interstate rail and commuter rail.

Amtrak connects stations in Dutchess County on its Empire and Adirondack Corridors, connecting with points throughout the national rail system. The Empire Corridor runs 463 miles between Penn Station in New York City and Toronto, Canada with stops at Yonkers, Croton-Harmon, Poughkeepsie, Rhinecliff, Albany, and other points north in the State of New York. The Adirondack Corridor shares its route with the Empire Corridor through Albany, where it continues north to Montreal, Canada. In 2009, the Empire Service carried over 925,000 passengers, and ridership at the Dutchess County stations of Rhinecliff and Poughkeepsie increased a total of 9 percent from 2006 to 2013 (PDCTC, 2013).

There are eight Metro-North facilities in the County; Poughkeepsie, New Hamburg, and Beacon on the Hudson Line, and Wassaic, Ten Mile River, Dover Plains, Harlem Valley/Wingdale, and Pawling on the Harlem Line. Between 2000 and 2009, week-day ridership from Dutchess County on the two lines increased by 30% and 45%, respectively. In 2009, Metro-North carried over 6,270 passengers on an average weekday from Dutchess County to the New York City metro area (PDCTC, 2013).



### Airports

There are eight airplane facilities in Dutchess County, ranging from small rural air fields to the Dutchess County Airport in the Town of Wappinger. All eight facilities are listed in Table 4-7 below.

The Dutchess County airport is a General Aviation airport which accommodates a range of aircraft types, mostly propeller driven aircraft having gross weights of less than 12,500 pounds and within the FAA’s Airplane Design Group I and Aircraft Approach Categories A and B. The airport provides corporate and general aviation transportation services on its three runways, associated taxiways, and aircraft parking aprons. The County Aviation Division offers fuel for airplanes at the County facility, and works closely with the Dutchess County Economic Development Corporation to market its services and to attract regionals and national traffic to the facility (Dutchess County Airport, 2004).

In addition to the airports, there are 14 helicopter landing pads throughout the county, also shown in Table 4-7 below.

**Table 4-7. Airports and Helicopter Facilities in Dutchess County**

Name	Municipality	Type
Sky Acres	Union Vale (T)	Air
Sherman Field	Beekman (T)	Air
Dutchess County	Wappinger (T)	Air
Sky Park	Red Hook (T)	Air
Old Rhinebeck	Red Hook (T)	Air
Airhaven	Hyde Park (T)	Air
Stormville	East Fishkill (T)	Air
Rocky Reef Farm	Stanford (T)	Air
Merritt Park	Fishkill (V)	Heli
IBM East Fishkill	East Fishkill (T)	Heli
IBM Fishkill Plant No. 2	East Fishkill (T)	Heli
Mid-Hudson Helicopter Service	East Fishkill (T)	Heli
Lightning Tree Farm	Washington (T)	Heli
State Police Troop K	Pleasant Valley (T)	Heli
Hammersley Hill	Pawling (T)	Heli
South Quaker	Pawling (T)	Heli
Poughkeepsie Main Plant	Poughkeepsie (T)	Heli
St Francis Hospital	Poughkeepsie (T)	Heli
Vassar Hospital	Poughkeepsie (C)	Heli
Cantagree Farm H	Stanford (T)	Heli
Dutchess County Fairgrounds	Rhinebeck (V)	Heli
Bel-Aire Farms	Amenia (T)	Heli

Sources: Dutchess County

### Ferries and Ports

Passenger ferries connecting Dutchess County locations with Orange County and Ulster County are available for commuters, residents, and visitors. The Newburgh-Beacon Ferry is operated by Metro-North Railroad and NY Waterway, and serves 300-400 customers per day with timely connections to trains arriving and departing the Beacon Metro-North station. An additional private water taxi was operating as of 2011, providing weekend, seasonal service between the City of Kingston in Ulster County and the Rhinecliff hamlet in the Town of Rhinebeck (PDCTC, 2013).

Dutchess County maintains five river-side ports and private shipping docks with access to the Hudson River’s deep water channel in the City of Poughkeepsie and the Town of Wappinger, and described below:





The City of Poughkeepsie

- The A.C. Dutton Lumber Corporation Dock is located one mile north of the Mid-Hudson Bridge, and is occasionally used by U.S. Coast Guard vessels for mooring during shore leave.
- The Love/Effron Dock is located one mile south of the Mid- Hudson Bridge, and receives petroleum products by barge.
- Sousa Poughkeepsie Terminal Dock is located 1.2 miles south of the Mid-Hudson Bridge, and was not in use as of 2013.

The Town of Wappinger:

- The New York Trap Rock Corporation Clinton Plant Dock is located 2.6 miles north of the Wappinger Creek in Wappinger, and is used to transport dolomite by ship and barge.
- The Point Street Terminal Dock is located 0.3 miles north of the Wappinger Creek in Wappinger, and is used to receive petroleum products by barge (PDCTC, 2013).

### 4.5.3 Lifeline Utility Systems

This section presents potable water, wastewater, energy resource, and communication utility system data. Due to heightened security concerns, local utility lifeline data sufficient to complete the analysis have only partially been obtained.

#### Potable Water

In Dutchess County, water is provided from various facilities as a public service or through private supplies, such as wells. A large portion of both the public and private supplies rely upon groundwater as their sole source for drinking water, yet the Hudson River is the County’s largest supplier of drinking water, especially for residents in the city and towns of Poughkeepsie, Hyde Park, Hopewell Junction (Maybrook water line), and the Village of Rhinebeck. Several smaller streams or reservoirs provide water for community systems in Beacon, Hyde Park, and the Village of Pawling as well as for large institutions in Dover, Beekman, and Red Hook. (CCEDC, 2010). The Dutchess County Department of Health oversees and enforces the routine monitoring of nearly 700 county public water supplies for the main forms of bacteria and chemicals affecting groundwater supplies in the County (Dutchess County Department of Health, 2014).

According to the EPA Safe Drinking Water Information System (SDWIS), there are 158 community water facilities in Dutchess County that serve the same people year-round (e.g. in homes or businesses), providing drinking water to 194,136 people (EPA Safe Drinking Water Information System (SDWIS), 2015).

The Dutchess County Water and Wastewater Authority is a public benefit corporation that owns and operates nine water systems, three sewer systems and one water transmission system, located within ten different municipalities throughout Dutchess County. These systems combine to serve over 4,100 residential and commercial customer connections.

Water districts that are not owned by the Dutchess County Water and Wastewater Authority set their own rates, subject to approval by a Town Board. The facilities associated with the treatment, storage, and transport of potable water to the County include 38 potable wells, 51 potable pumps, 39 potable water storage facilities, and are shown in Figure 4-17, below.

#### Dutchess County Wastewater and Sewer Facilities

Most cities and villages in Dutchess County operate some level of a municipal sewer utility. Outside of these population centers, homeowners have individual septic systems. The exception is where large subdivisions build



private sewer systems with their own treatment plant. All Dutchess County municipalities operate waste water treatment plants except for the towns Milan, Pine Plains, North East, Millerton (Village), Stanford, Clinton, Pleasant Valley, and Union Vale. The Dutchess County Water and Wastewater Authority owns and operates three sewer systems, the Chelsea Cove Wastewater System in the City of Beekman, Dalton Farms Wastewater System in the Town of Beekman, and the Valleydale Wastewater System in the Town of Pleasant Valley.

### **Energy Resources**

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Power in Dutchess County is transmitted and distributed by three companies: Central Hudson Gas and Electric, Just Energy, and New York State Electric and Gas (NYSEG). Homes in the County are heated by many different sources, with a majority using utility gas or fuel oil to heat their homes (Dutchess County, 2015).

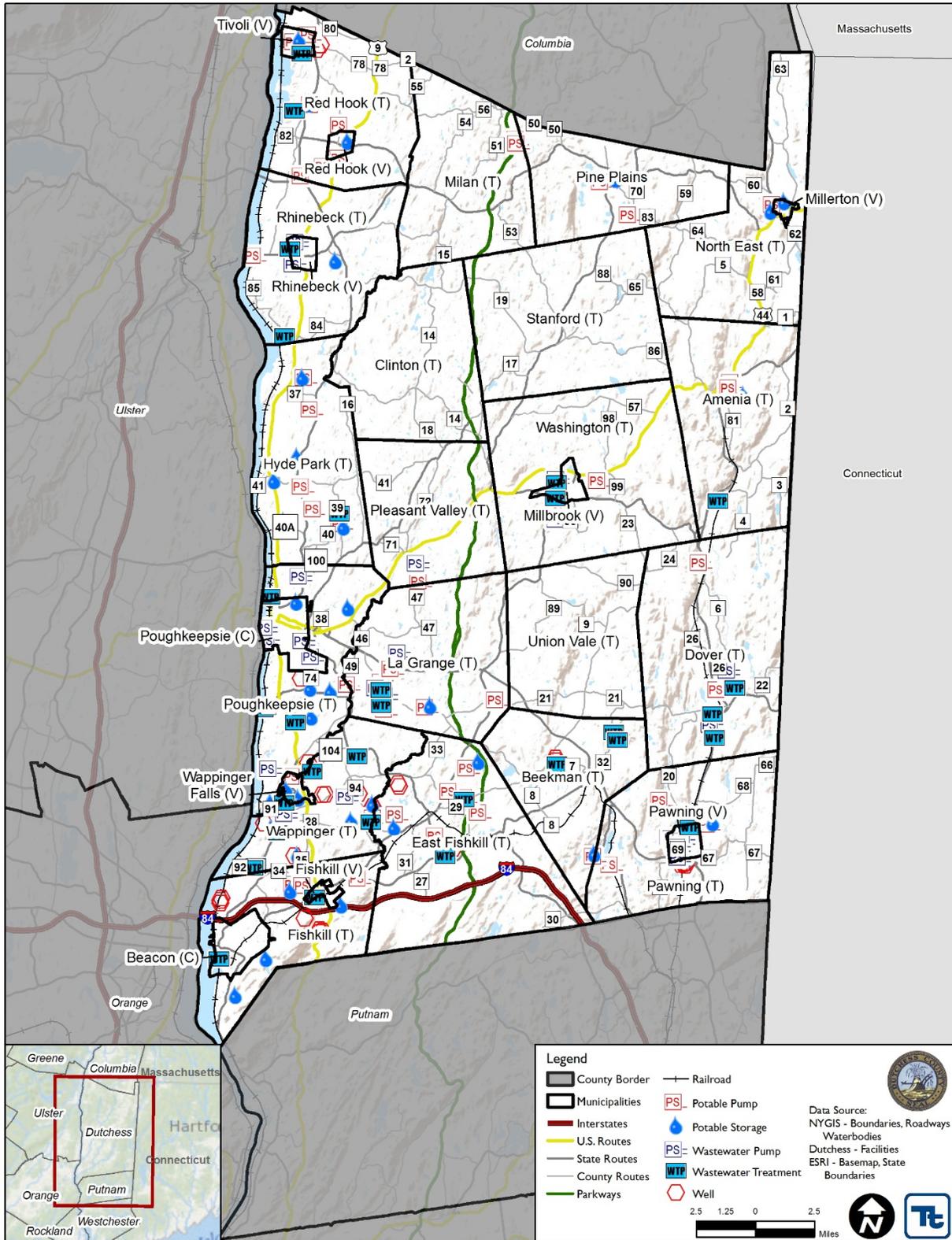
### **Communications**

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Communications systems in the County are provided by multiple companies, which includes: Cablevision, RCN, DIRECTV, Dish Network, Exede and Exede Voice, HughesNet, Verizon and Verizon FIOS Internet. Figure 4-17 shows the locations of the facilities for these various lifeline utility systems.



Figure 4-16. Utility Lifelines in Dutchess County



Source: Dutchess County, NYGIS





#### **4.5.4 High-Potential Loss Facilities**

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High-potential loss facilities include dams, levees, hazardous materials facilities (HAZMAT), nuclear power plants and military installations. Dams are discussed below. Figure 4-18 shows the locations of the High-Potential Loss Facilities in the County.

##### **Dams and Levees**

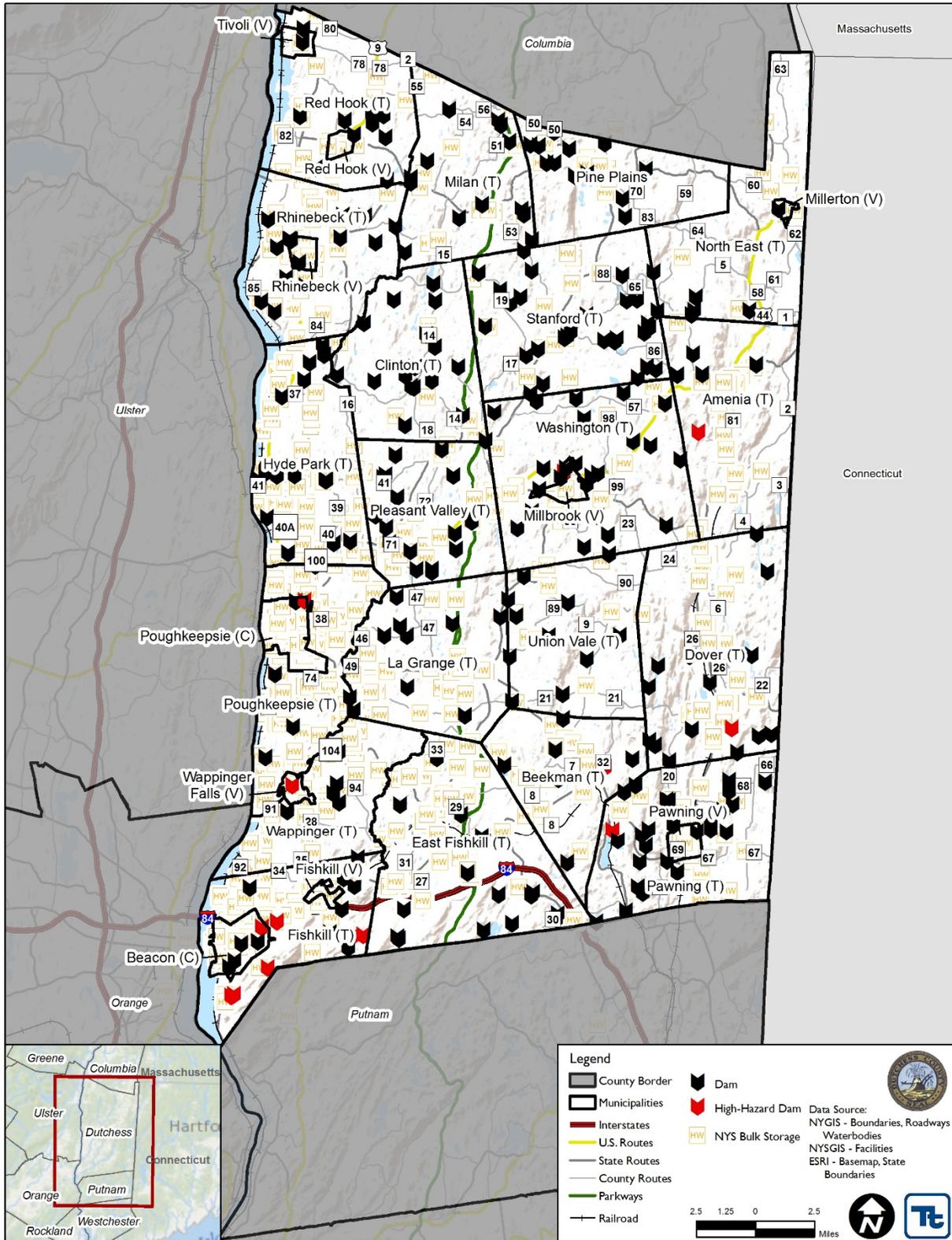
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According to the National Inventory of Dams (NID), there are 81 dams in the County. A dam is included in the NID if: (1) it is a “high” or “significant” hazard potential class dam or, (2) it is a “low” hazard potential class dam that exceeds 25 feet in height and 15 acre-feet storage or, (3) it is a “low” hazard potential class dam that exceeds 50 acre-feet storage and 6 feet height. 14 dams have been identified as high hazard dams in Dutchess County (NID, 2015).

The Planning Committee compiled a list of 282 dams throughout the County, many of which do not fall into any of the categories catalogued by the NID. Figure 4-18 shows the dams in Dutchess County, as identified by the NID and Planning Committee.



Figure 4-17. High-Potential Loss Facilities in Dutchess County



Source: Dutchess County, NYGIS; NID, 2015.





### Hazardous Materials Facilities

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According to EPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) (Superfund) Public Access Database (CPAD) reports that there currently are 17 Superfund sites in Dutchess County, all of which involved contamination of groundwater. Superfund sites are polluted locations requiring a long-term response to cleanup of hazardous material contaminations.

Abandoned hazardous waste sites placed on the federal National Priorities List (NPL) List include those that the EPA has determined present "a significant risk to human health or the environment," with the sites being eligible for remediation under the Superfund trust fund program. As of 2013, Dutchess County currently has five inactive hazardous sites in the federal Superfund Program that are listed on the NPL, including Haviland Complex, Hopewell Precision, Jones Sanitation, Sarney Farm, and Shenandoah Road (PDCTC, 2013).

In addition to the hazardous waste sites, there are numerous hazardous facilities in Dutchess County catalogued by the NYS DEC's Bulk Storage Program Database. The Bulk Storage Program includes three types of facilities; Petroleum Bulk Storage (PBS), Major Oil Storage Facilities (MOSF), and Chemical Bulk Storage (CBS). Registration with NYS DEC is mandatory for all PBS facilities with a total storage capacity of 1,100 gallons or more; all CBS underground tanks and all stationary aboveground tanks with a capacity of 185 gallons or more; and all MOSF Sites storing more than 400,000 gallons of petroleum products. As of June 2015, there are 1,137 Sites in the DEC's Bulk Storage Program Database in Dutchess County, NY (New York State Department of Environmental Conservation (NYSDEC), 2015).

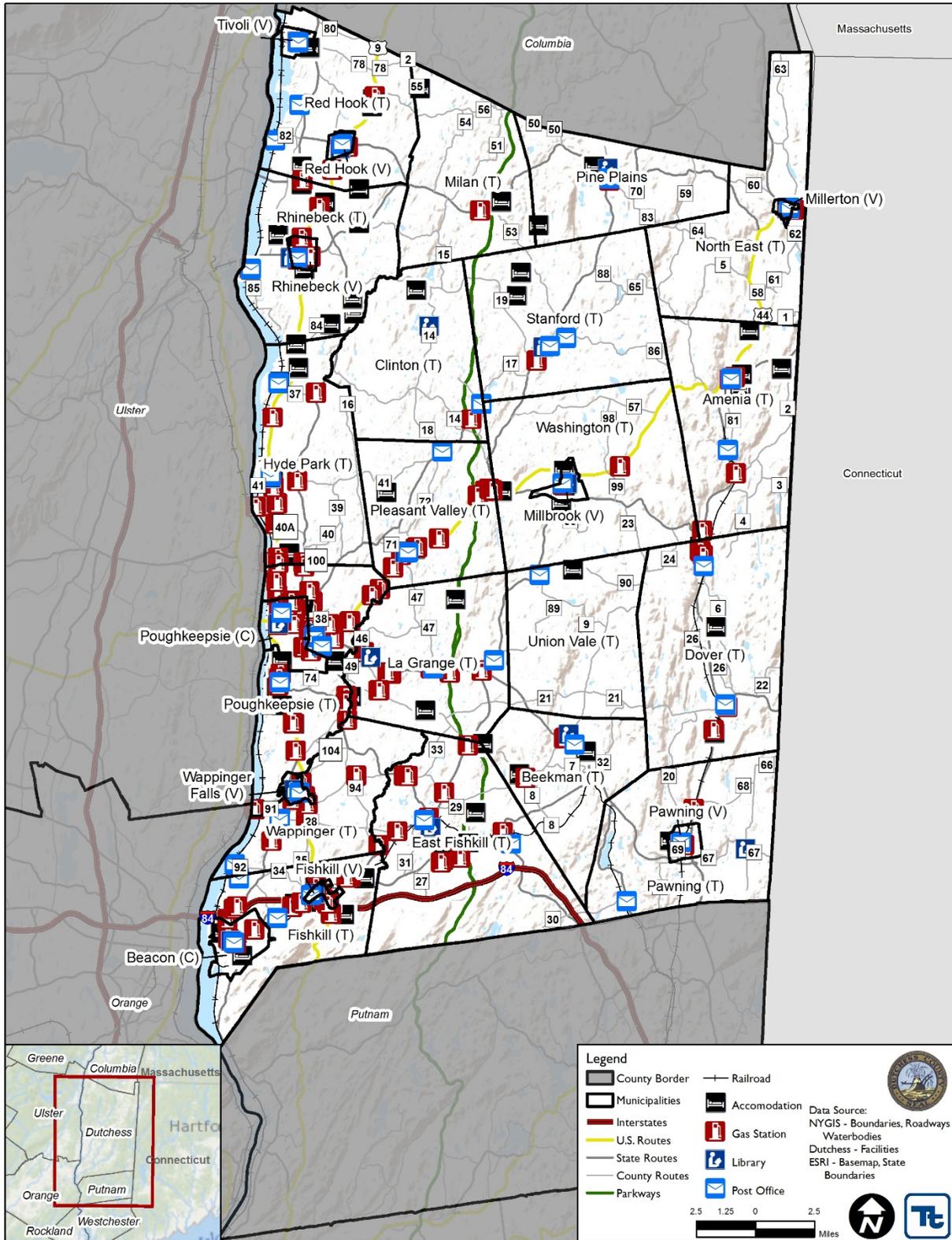
#### 4.5.5 Other Facilities

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The Planning Committee identified additional facilities (user-defined facilities) as critical including municipal buildings and other government facilities. These facilities were included in the risk assessment conducted for the County. Figure 4-19 shows the locations of these facilities in the, which were identified by Dutchess County.



Figure 4-18. Other Facilities in Dutchess County



Source: Dutchess County, NYGIS

